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Nkupe Shelter: report on excavations in the eastern Biggarsberg, Thukela Basin, Natal, South Africa

by

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ABSTRACT

Excavations at the Nkupe Shelter in the eastern Biggarsberg are reported. The deposits at this site date to the mid-and late Holocene. Large lithic and non-lithic cultural, plant and faunal assemblages were recovered during the excavations and these are described. A brief outline of some of the conclusions reached in a major synthesis of Thukela Basin hunter-gatherer history are presented. In particular, it is submitted that the Thukela Basin 7000–2000 BP hunter-gatherer society experienced economic intensification as well as social restructuring.

INTRODUCTION

In 1981 I initiated a project aimed at investigating the ecology of the Holocene Later Stone Age (LSA) hunter–gatherers of the Thukela Basin. To this end, I excavated ten rock shelters in the basin and one close by between 1981–1984 (Mazel 1984*a b c* 1986*a b* 1987*a b* 1988). The former sites were situated in the upper Thukela Catchment and covered all the major ecological zones in this area. No suitable sites are known in the coastal zone of the basin. I did, however, excavate a site (Sibudu Shelter) about six kilometres inland from the coast and about 50 km south of the Thukela River mouth, to try to gather information on Holocene hunter–gatherer coastal and near coastal settlement. However, as this site contained late farming community remains (ie. after AD 1000) underlain by Middle Stone Age (MSA) deposits, it was not beneficial to this project.

The theoretical philosophy guiding the project has altered substantially since its inception (Mazel 1987*a b*). No longer am I primarily concerned with human ecology, but instead the reconstruction of a regional social history in which human ecology comprises only one of the facets of the study. Nkupe Shelter is one of the key sites for documenting and explaining the Thukela Basin hunter–gatherer Holocene past. It contains probably one of the most complete and detailed 7000–2000 BP sequences known in southern Africa, and, in addition, produced a substantial quantity of subsistence and material cultural remains. Although information from this site has already been published (Mazel 1984*a* 1987*b*), this article is the final site report for the three excavations conducted at this site between 1–30 October 1981, 22 January–12 February 1982 and 20 January–February 1984.

Nkupe Shelter (S 28° 08′ 48″, E 29° 56′ 12″) is situated on a hill with the same name on the farm Quaggiskirk some 30 km west of Dundee (Fig. 1). It is close to the source of the Nkunzi River which flows into the Ndaka (Sundays) River, one of the main tributaries of the Thukela River. Well screened by natural vegetation

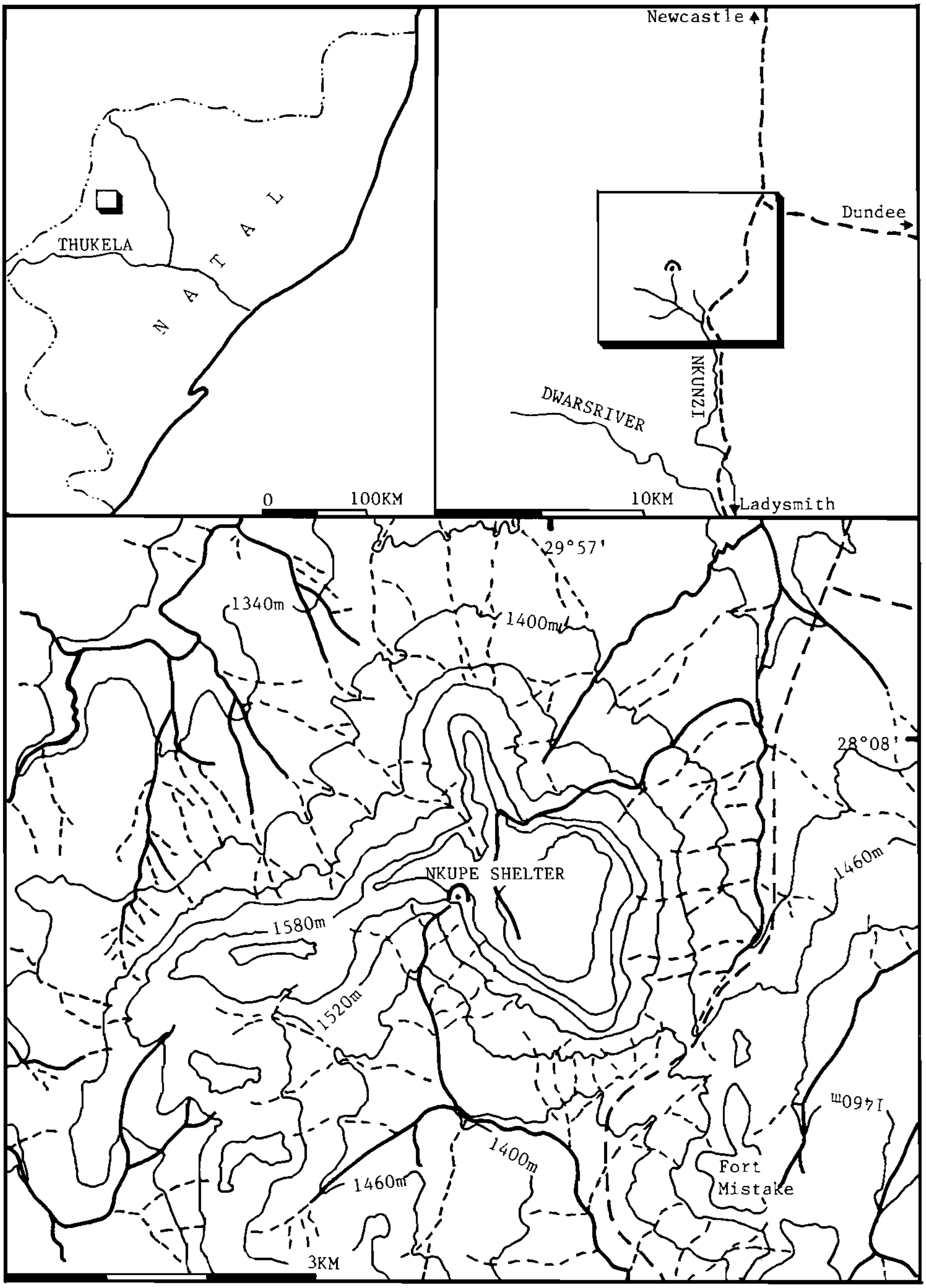

Fig. 1. Location of Nkupe Shelter.

(Fig. 2) there is almost no outside visibility from inside the rock shelter. From immediately above the site, however, there is an extensive outlook (Fig. 3). Facing SW the rock shelter received only late afternoon sun during our visits. At an altitude of 1618 m (5310 ft), Nkupe Shelter is situated geologically in the Estcourt Formation of the Beaufort Group but the surrounding geology is dominated by the Vryheid and Volksrust Formations which are in the Ecca Group (1984 Geological Map of South Africa). In terms of vegetation, the site is located in the *Themeda-Trachypogon* Grassland of the Uplands Vegetation, but close by are extensive areas of *Themeda-Hyparrhenia* Grassland and Moist Transitional *Themeda-Hyparrhenia* Grassland of the Valley Vegetation (Edwards 1967). No rock paintings were visible on the walls of this rock shelter, but on Nkupe Hill we located two small rock shelters, one of which contains five paintings of humans, and the other, one. Nkupe Shelter is 40 m long, reaches a maximum depth of 20 m and a maximum height of 13 m.

Fig. 2. View of Nkupe Shelter.

Fig. 3. View from above Nkupe Shelter down the Nkunzi Valley.

EXCAVATION

Eight square metres were excavated at the entrance to a cavern near the centre of the shelter and one test square metre closer to the lip of the shelter (Figs 4 & 5). This report deals with the main excavation. The reason for situating this at the entrance to the cavern was that it offers good protection from the wind and rain and has sufficient ventilation to ensure that smoke from fires would not make living there intolerable. That it offered good protection from the elements was proven when we had to abandon our rain- and windswept camp on the evening of the 31st January 1984 due to Cyclone Demoina and took refuge in the rock shelter. Besides this spot being a preferable living area, I also figured that its protection from the elements would enhance organic preservation. As anticipated, this area turned out to be archaeologically very profitable, containing extensive and well-stratified ash and brown sand deposits, with good organic preservation in both.

Considering the site as a whole, a relatively small surface area was sampled and a great deal of scope exists for more extensive excavations.

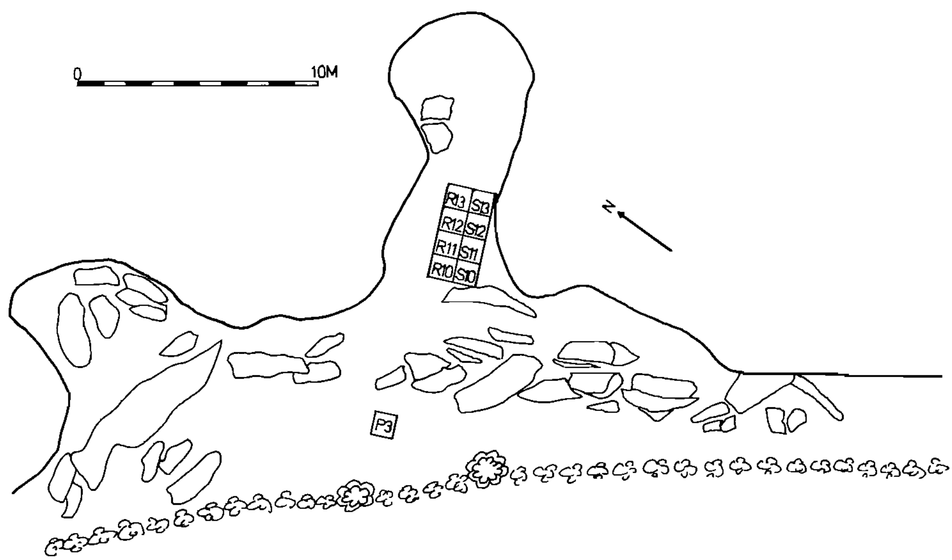

Fig. 4. Nkupe Shelter: site plan.

Bedrock was not uncovered in any of the squares. The maximum depth reached was 2,3 m in R11, but the lower 70 cm were almost sterile. As in the case of Diamond 1 (Mazel 1984*c*), Mgede Shelter (Mazel 1986*a*) and Sikhanyisweni Shelter (Mazel 1988), I decided to concentrate on the upper, richer deposits rather than probe for bedrock, which could still be several metres below where we stopped. The excavations were done, where possible, using natural stratigraphy but where units were thicker than 10 cm they were removed in 10 cm spits. Rootlets first appeared in Layer 3, some 60 cm below the surface.

Fig. 5. Nkupe Shelter: the rock shelter.

Examination of Figs 6 & 7 reveal some interesting general patterns which need highlighting before detailed discussion of the excavated deposits. The major ash deposits with the exception of the upper White Ash 1 complex all penetrated similar distances into the cavern. The White Ash 2 and Grey Brown Sand (Layer 5) and Grey Ash 1 (Layer 6) deposits petered out in R12 and S12, the White Ash 3 (Layer 7) and Grey Ash 2 (Layer 9) peter out in R11 and S11 and it seems highly likely that Brown Sand with Ash (Layer 8) and Red Sand with Ash (Layer 10) will peter out in R12 and S12. The White Ash 1 complex, on the other hand, still occurred in R13 and S13, though clearly decreasing in size. This shift in the organisation of living space between the Layer 3 and underlying deposits was largely, if not entirely, precipitated by a major rockfall at the entrance to the cavern after the deposition of the Layer 5, White Ash 2 complex, which is dated to 3950 ± 70 BP (Pta 3275) (Fig. 8).

Figs 6–8, as well as Figs 9–11, show spatial associations between the ash and brown sand deposits, which, arguably, represent discrete activity areas. Simply, we have a situation where the central ash deposits are abutted on the sides and towards the back of the cavern by brown sand deposits. This suggests that people had large centralised hearths which were surrounded by areas where they may have, among other things, processed and eaten food, made and repaired cultural artefacts, and slept.

Eleven layers have been identified (Figs 6–11). These layers were not all removed from throughout the excavation area: Layers 1–6 were excavated in all

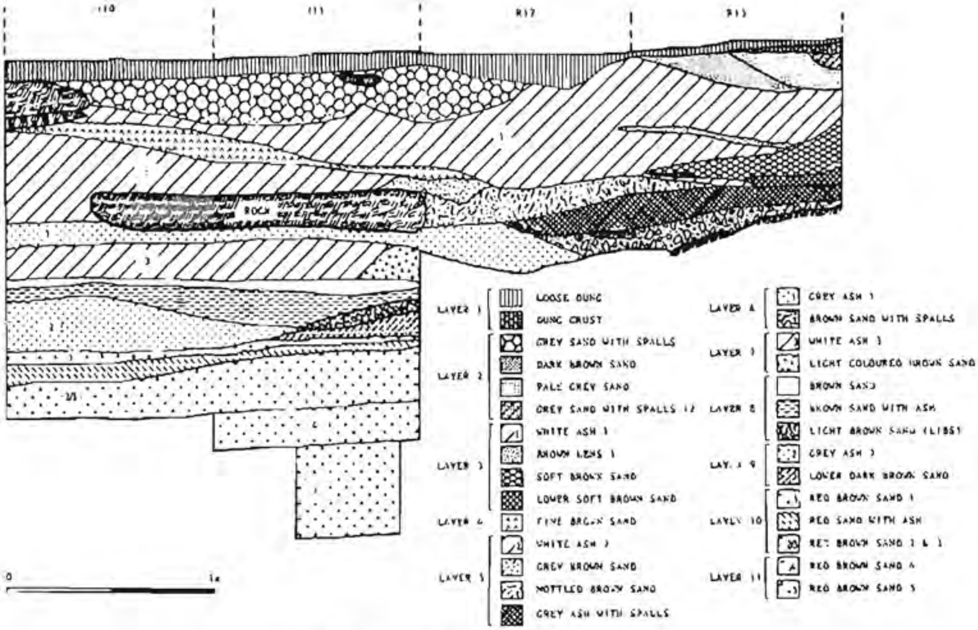

Fig. 6. Nkupe Shelter: R10–R13 section.

Fig. 7. Nkupe Shelter: end of the 1984 excavation.

Fig. 8. Nkupe Shelter: front section, showing rockfall.

eight squares; Layers 7 and 8 in the 10 and 11 squares but Layer 8 only partially in S11; Layer 9 in R10 and R11 and S10; Layer 10 in R10 and R11; and Layer 11 in R11.

Layer 1: comprised four excavated units, all of which consisted either entirely of domestic animal dung or were rich in dung. Loose Dung (LD), the uppermost unit, was the most voluminous of these units and covered all the squares. Underlying LD in parts of R13 and S13 closest to the back of the cavern was a harder, compacted dung deposit, named Dung Crust (DC) (Fig. 6). Lying alongside DC in S13 and adjacent to the cavern wall was a similar, but burnt, deposit, named Burnt Dung Crust (BDC) (Fig 10). Finally, underlying DC and BDC in R13 and S13, but primarily in S13, was Topsand (TS), a gritty, brown sand deposit rich in dung, which appeared to have been dug into the underlying Layer 2 deposits. This layer was poor in archaeological remains, with TS noticeably richer than the other units.

Some 0,84 m^3 of deposit was excavated from this layer.

Layer 2: comprised nine excavated units, which arguably represented two episodes of disturbances of the underlying deposits. First, there were Top Brown Sand (TBS) Spits 1–3 and the Grey Sand with Spalls Spits 1 & 2 deposits which occurred in all the squares excavated but petered out in R13 and S13 (Figs 6, 9 & 10). GSS was a fine, greyish sand whilst TBS was a fine brown sand. Both sets of deposits contained numerous roof spalls. The spatial distribution of GSS and TBS coincides roughly with the distribution of the underlying ash and vegetation-rich

brown sand deposits respectively. In view of this, and the morphology of the GSS and TBS deposits, it seems probable that they were comprised largely of the disturbed underlying deposits.

Another set of deposits which owe their existence to disturbances, was removed from R13. As with GSS and TBS, these deposits were comprised of both grey and darker coloured components; Pale Grey Sand (PGS) was a fine, grey sand, and Dark Brown Sand (DBS) was a fine, dark brown sand (Fig. 6). The deposit removed as GSS IZ in R13 was similar to GSS 1 and 2, but as they were not connected, the nature of their relationship was unclear.

In R13, where both sets of the disturbed deposits occurred, GSS truncated DBS, and this suggested that the GSS and TBS deposits were younger. As so little of DBS and PGS has been removed, together only 0,04 m^3, they have been combined with the GSS IZ and more voluminous GSS and TBS deposits. If the excavations are extended, this association will have to be reviewed and PGS and DBS may well have to form a separate layer.

Some 1,34 m^3 of deposit was removed from this layer.

Layer 3: comprised 23 excavated units, but essentially three main components, which were clearly associated stratigraphically, were recognisable (Figs 6–11). These were, firstly: the White Ash 1 complex which comprised the White Ash (WA) 1 A–E C(Z), C(Lens), D(Z), E(L), R, H and rocks (R) excavation units; secondly, the vegetation-rich deposits which included Vegetation Patch (VP) 1, 1a and 2 and Contact 1 (CNT 1), and thirdly, what will be known as the Inner Deposits which with the exception of Ash Lens 1 (AL 1), were a series of brown sand units and included Light Brown Sand (LBS), Brown Lens (BL) 1–3, Soft Brown Sand (SBS) and Lower SBS (LSBS).

Excavation of the WA 1 complex, whose deposits covered the entire excavation area excluding the narrow strip of vegetation rich deposits alongside the cavern wall on the right (Figs 9–11) was done primarily using 10 cm spits. However, after completion of the excavation of this complex, close examination of the R10–R14 and R14–S14 sections revealed that the ash was stratified (Figs 12 & 13). Indeed, what appeared during the excavation to be a uniform white, soft and powdery deposit, in the main section showed subtle differences in coloration (Figs 12 & 13). Study of this section suggested that there were at least three major disturbances of the ash by the site's occupants during the 700-year period that it was being deposited. A charcoal sample removed *in situ* from WA 1B, R10 and thus from the earliest ash deposits in this layer, has been dated to 3190 ± 60 BP (Pta 3269) and another charcoal sample taken *in situ* from WA 1H, S13, the final ash deposit, has been dated to 2480 ± 60 (Pta 3443). Not surprisingly the lithic formal tool composition of the different stratified ash lenses are similar and this provides added justification for viewing them as one entity. Some 1,5 m^3 of deposit was removed from the WA 1 complex.

The vegetation patches were fine brown sand deposits extremely rich in plant remains. Indeed, while the Inner Deposits and WA 1 complexes averaged about 20 seeds per excavated bucket, the vegetation patches and CNT 1 averaged just over 230 seeds per bucket. Furthermore, the average mass of unworked wood,

twigs and bark per bucket in the WA 1 complex, the Inner Deposits and the vegetation patches and CNT 1 was, 4, 16 and 105 grams respectively. These differences must, however, be viewed against the overall similarity in formal tool proportions between these deposits with adzes being totally dominant, varying between 73–83 % of the formal tools. Returning to the nature of the deposits, the CNT 1 deposits occurred literally at the contact area between the WA 1 and VP 2 (Figs 9–11) and thus were a mixture of fine white ash and brown sand. Some 0,42 m^3 of deposit was removed from VP 1, 1a and 2 and CNT 1.

The Inner Deposits were comprised primarily of SBS and LSBS. Associated with these were a series of smaller brown lenses, a light-coloured brown sand and a thin ash lens. The brown lenses and the light-coloured brown sand (LBS) were important in establishing the links between different deposits, as for example, BL 1 & 2 link the WA 1 and SBS deposits (Fig. 6) and LBS which occurred in the WA 1 complex merged into SBS (Fig. 9). The LBS deposit was a fine, light-coloured brown sand which seems to derive its colour from the mixing of brown sand and white ash, whilst SBS was a very fine and soft brown sand of medium colour. SBS was the uppermost deposit to contain little rootlets. SBS was separated from the identical LSBS deposits over most of the area they were excavated by a thin orange deposit, but in part of S13 they were also divided by VP 1

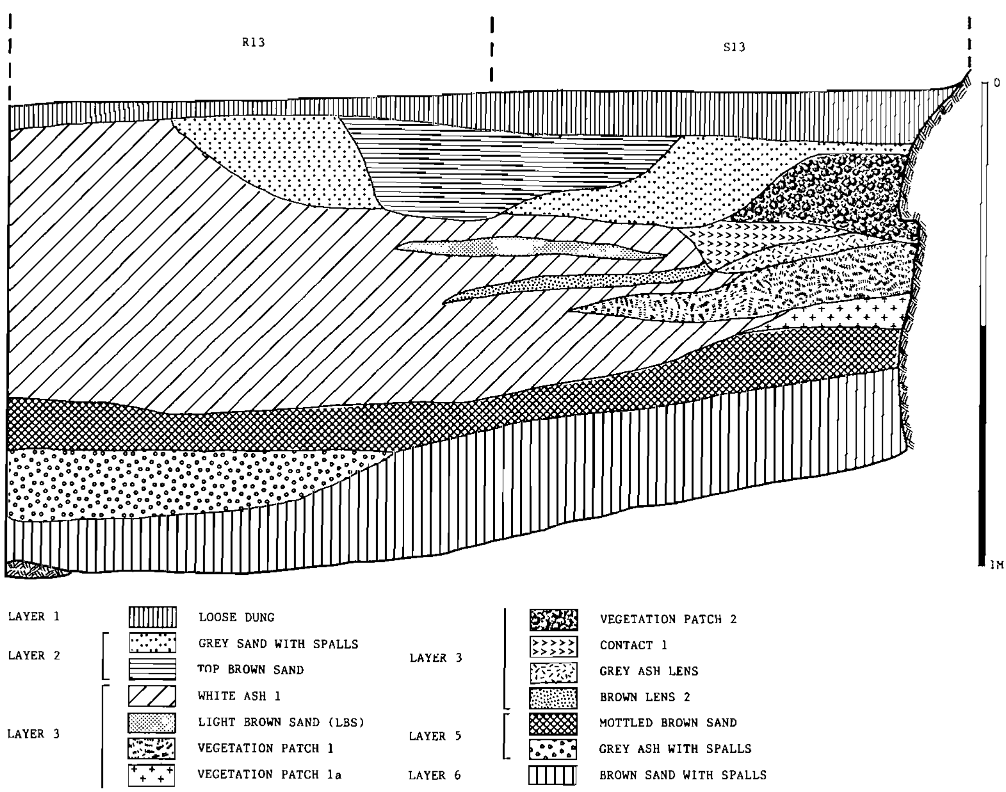

Fig. 9. Nkupe Shelter: R13–S13 section.

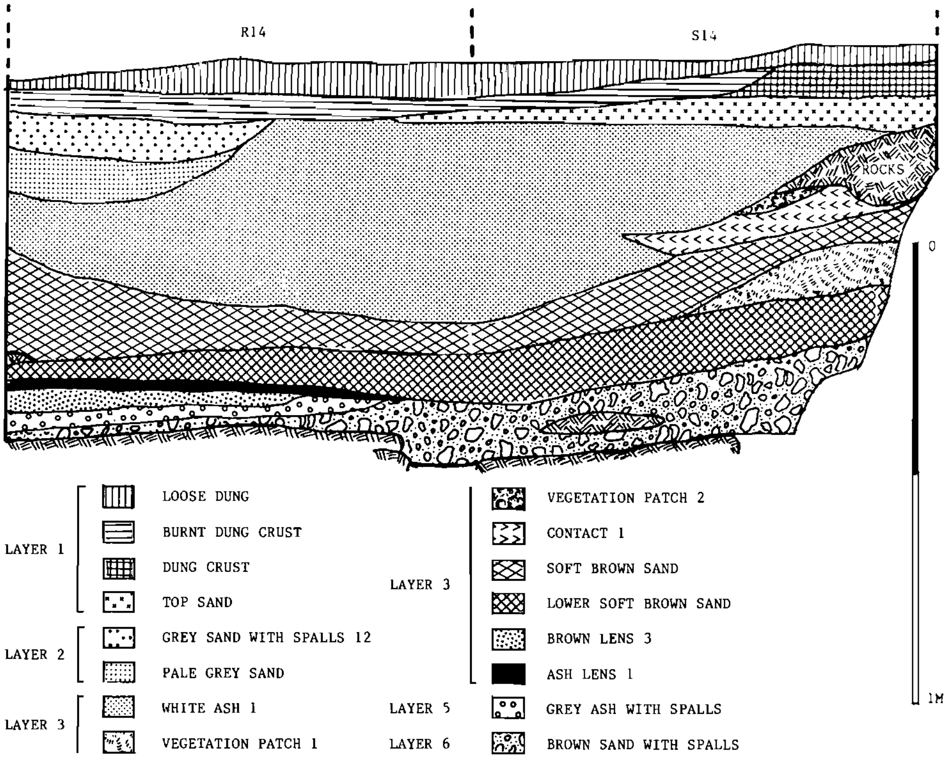

Fig. 10. Nkupe Shelter: R14–S14 section.

(Fig. 10). AL 1 was a thin ash lens at the base of LSBS in R13 (Fig. 10) and it was underlain by a relatively thin brown sand lens (BL 3) (Fig. 10). Some 0,24 m^3 of deposit was removed from the Inner Deposits.

Overall, some 2,16 m^3 of deposit was removed from Layer 3.

Layer 4: comprised one major and one subsidiary unit, the former being a very fine, soft brown deposit which separated the WA 1 and WA 2 complexes, and was called Fine Brown Sand (FBS). This deposit lightened in colour the further into the cavern one proceeded and, in fact, petered out in the 12 squares (Figs 6 & 13). The other stratigraphic unit in this layer was FBS Rocks which occurred in S10 close to R10. This deposit, which was identical to FBS and adjacent it, contained numerous rocks.

Some 0,41 m^3 of deposit was removed from this layer.

Layer 5: comprised nine excavated units, but essentially three main components were recognisable. These were: firstly, White Ash 2 (WA 2), a large white ash body into which Grey Brown Sand (GBS) has been incorporated; secondly, a mottled brown sand (MBS), and thirdly, Grey Ash with Spalls (GAS) (Figs 6, 9 & 10). As in Layer 3, and indeed in some of the underlying layers, Layer 5 had a central ash area abutted by brown sand deposits, and these different deposits probably represent hearth and associated living areas.

The WA 2 complex, which was divided into four 10 cm spits (ie WA 2A–D), was a very fine white ash. A charcoal sample taken *in situ* from WA 2B, R11, was dated to 3950 ± 70 BP (Pta 3275). At the WA 2 and MBS contact point there was, in some areas, a fine and soft, grey-brown coloured deposit (ie GBS—see Fig. 6), which presumably derived its colour from the mixing of these deposits. WA 2 occurred in the 10 and 11 squares whilst GBS occurred in the 11 and 12 squares (Fig. 6).

MBS was, as its name suggests, a mottled brown sand deposit with a spectrum of brown sands ranging in colour from grey-brown to dark brown. MBS contained some very fine soft vegetation which may be grass. MBS occurred in all the squares except R10 but, as Figs 6, 9 & 10 show, it petered out in R13 and S13.

GAS is a fine and powdery grey ash deposit rich in roof spalls. I first excavated it in R12 where it separated MBS and the underlying Layer 6 deposits (Fig. 9). Further into the cavern, in R13 where the MBS deposits were absent, GAS separated Layers 3 and 6 (Fig. 10).

Some 1,19 m^3 of deposit was removed from this layer.

Layer 6: comprised four excavated units which essentially constituted two bodies of deposit. There was Grey Ash 1 (GA 1) which occurred in the 10, 11 and 12 squares but not the 13 squares, and lying alongside this ash deposit on the right-hand side looking into the cavern and towards the back of the cavern was a brown sand deposit which contained numerous spalls, and was named Brown Sand with Spalls (BSS). BSS occurred in all the squares except R11, and was ephemerally

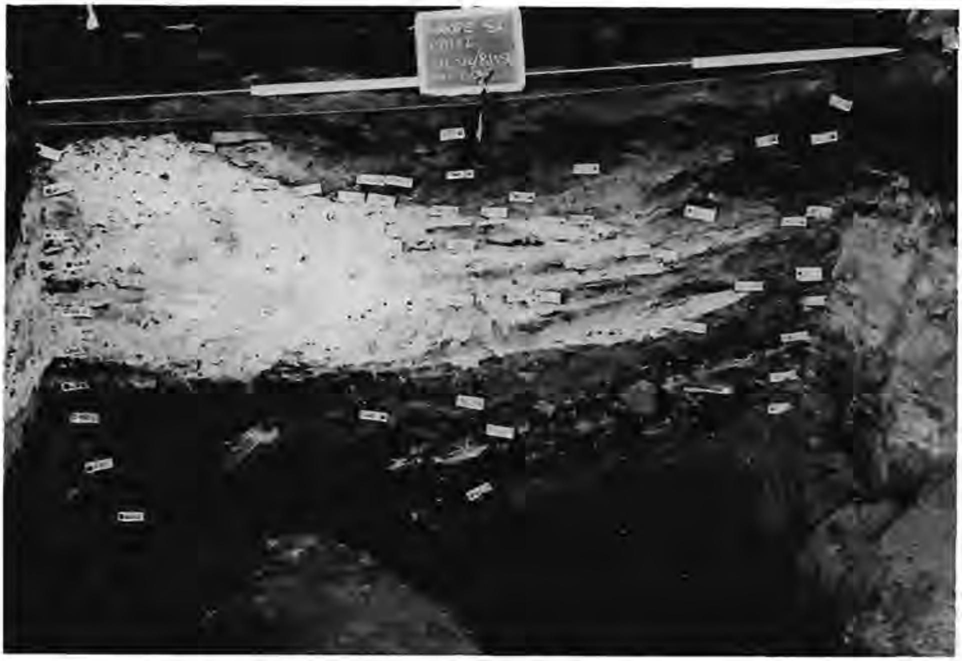

Fig. 11. Nkupe Shelter: R13–S13 section (referred to during excavation as the R12,S12/R13,S13 section).

represented in R10. GA 1 was a fine, soft and powdery deposit, and BSS, which was divided into two spits, was generally darker in colour than the overlying MBS and in some places was a rich orange-brown colour. BSS also contained more and larger spalls than MBS. Underlying the large rock which occurred in R10 and R11 (Figs 6, 7 & 11), was a deposit which closely resembled BSS and definitely connected to Layer 6. It was removed as BSS 2 Rock.

Some 0,87 m^3 of deposit was removed from this layer.

Layer 7: comprised four excavated units, Light Coloured Brown Sand (LCBS) 1 and 2 and White Ash (WA) 3A and B. As with Layer 6, essentially two components were represented; ash and an associated brown sand. The fine, white ash deposits of WA 3 occurred in the 10 and 11 squares, and petered out in the former, whilst LCBS, which was a fine, soft, light-coloured brown deposit, did not occur in R10 and S10 and its location in R11 and S11 was restricted to the back half of these squares (Fig. 6). It is possible that LCBS was similar to GBS in Layer 5, in that it represented the interface between the white ash and a darker brown sand deposit, deriving its colour from the mixing of these deposits. A charcoal sample taken *in situ* from WA 3B, R10 was dated to 4590 ± 70 BP (Pta 3276).

Some 0,65 m^3 of deposit was removed from this layer.

Layer 8: was somewhat different from the overlying three layers in that there was no clear spatial separation of ash and brown sand deposits. Instead, Layer 8 was comprised of two main components, one of which was a mixture of ash and brown sand, named Brown Sand with Ash (BSA) and the other, which overlay BSA, was a fine, soft brown sand known simply as Brown Sand (BS) (Fig. 6). BSA and BS both occurred in the 10 and 11 squares. The other excavated units which constituted Layer 8 were: an ashy brown lens (Brown Lens 4) which was connected to BS; a brown sand deposit, called Brown Sand Lower (BSL), which underlay BSA in R11; and finally, a fine, light-coloured brown sand which was almost yellowish in places, called Light Brown Sand (LIBS), and whose colour probably derived from the mixing of white ash and brown sand. LIBS underlies BSA and BSL in parts of R11 (Fig. 6).

Some 0,57 m^3 of deposit was removed from this layer.

Layer 9: comprised two sets of deposit; a compacted grey ash deposit which was divided into two spits (GA 2A and B), and fine, dark brown, charcoal-rich sand, called Lower Dark Brown Sand (LDBS) (Fig. 6). As with Layers 3 and 5–7, there was a clear spatial separation between the ash and brown sand deposits, and this

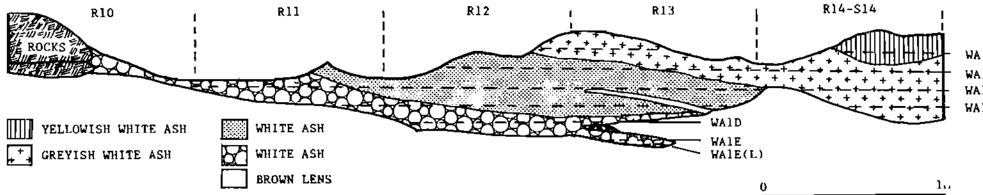

Fig. 12. Nkupe Shelter: White Ash 1 complex showing the natural stratigraphy and the spits with which the deposit was removed.

Fig. 13. Nkupe Shelter: R10–R13 section C referred to during excavation as the P/R section).

probably reflects differential occupation areas. A charcoal sample taken *in situ* from GA 2B, R10 was dated to 5760 ± 70 BP (Pta 3460).

Some 0,41 m^3 of deposit was removed from this layer.

Layer 10: comprised a reddish brown sand deposit which was removed in 10 and 15 cm spits, and a reddish deposit with ash in it which separated RBS 1 and RBS 2 (Fig. 6). The former was named Red Brown Sand (RBS) and the latter Red Sand with Ash (RSA). RBS 1 and 2 were 10 cm spits and RBS 3 was a 15 cm spit. The ash in RSA occurred in two forms, as consolidated ash areas and as small ashy nodules. A charcoal sample collected both *in situ* and handpicked from the sieves, from RBS 2, R10 was dated to 6650 ± 80 BP (Pta 3455).

Some 0,71 m^3 of deposit was removed from the layer.

Layer 11: comprised two RBS spits. RBS 4, taken over the whole of R11 to a thickness of 20 cm, was a hard deposit containing lots of shale spalls and was generally darker than RBS 3. RBS 5 was similar to RBS 4, and was taken to a depth of roughly 40 cm over a 50 by 40 cm area in R11, and was sterile except for the occasional pieces of bone, stone and charcoal.

Some 0,33 m^3 of deposit was removed from this layer.

Dating and correlation

Four of the six dated charcoal samples from this site came from R10 and another was recovered from the adjacent R11. The sixth sample, which dates the top of the WA 1 complex, came from S13. All the dated samples, with the exception of the Layer 10 sample, came from ash deposits. The dates are, from the bottom up, 6650, 5760, 4590, 3950, 3190 and 2480 BP. In Table 1 these dates and the depth of deposit separating consecutive dates are presented along with

TABLE 1
Nkupe Shelter: Deposition rate between dated levels.

Dates (BP)	Years separating consecutive dates	Depth of deposit between dates	Years per cm
2480–3190	710	20 cm	35,5
3190–3950	760	30 cm	25,3
3950–4590	640	35 cm	18,3
4590–5760	1 170	35 cm	33,4
5760–6650	890	25 cm	35,6

average deposition rates between dated deposits. Although these deposition rates must be treated somewhat cautiously, it is nevertheless interesting that for the most part there seems to have been a consistent rate of deposition of about 35 years per centimetre. Between 4590 and 3190 BP, but particularly 4590 and 3950 BP, the deposition rate appears to have been faster. I am not sure what meaning to attribute to these differences, but it certainly appears that the site was intensively occupied between 2000 and 7000 BP, with no major hiatuses evident. Thus, Nkupe Shelter provides an excellent sequence from which to document the Holocene hunter–gatherer history of its environs, and together with the other excavated Thukela Basin sites, that of the general research area.

The only unresolved dating of archaeologically rich deposits at this site is that of Layer 2, which, as mentioned earlier, appears to be comprised largely of disturbed Layer 3 deposits. Containing pottery, a cane glass bead and an ostrich eggshell (OES) bead with a type of wear pattern which seems to occur only in the last two thousand years, it is almost certain that Layer 2 dates within the last 2 000 years. Unfortunately, the small pottery sample (12 pieces) is adiagnostic and provides no indication as to the precise age of this layer. The cane glass bead recovered from the upper Layer 2 deposits (ie. GSS 1) in R11, probably dates within the last millennium. A cane glass bead was recovered from the 820 ± 50 BP Mgede Shelter deposits (Mazel 1986*a*). It would thus seem that Layer 2 dates to within the last 2 000 years and, on the evidence of the cane glass bead, that the GSS/TBS deposits may date to within the last 900 years.

CULTURAL ASSEMBLAGES

Stone artefacts

Terminology and definitions used in previous Thukela Basin LSA excavation site reports (Mazel 1984*b*, *c* 1986*a*, *b*) apply here and are therefore not restated. Layer 11 is omitted from the following discussion because it produced only 15 artefacts.

Raw material: The raw material composition of the different artefact categories and the scrapers, adzes and backed pieces are presented in Tables 2 and 3 respectively. Overall, hornfels is clearly the dominant raw material at this site and is followed numerically by dolerite, Cryptocrystalline silicates (CCS), quartz and 'other'. However, examination of Table 2 reveals that hornfels is less dominant in Layers 1, 2 and 10. In Layer 10, the comparatively low hornfels proportion corre-

sponds with relatively high CCS, quartz and dolerite proportions, whilst in Layers 1 and 2 they correspond with higher quartz and dolerite, but not CCS, proportions. The overall CCS proportions at this site are highest in Layers 8–10, and the significance of this will be discussed later.

The utilised category is also largely dominated by hornfels. However, in Layer 1, which has five pieces, only 40 % of the pieces are of hornfels, the rest are 'other' and dolerite. Dolerite, CCS and quartz are better represented in the utilised category than their overall representation at this site. Dolerite is best

TABLE 2

Nkupe Shelter: raw material composition of the different artefact categories.

	Quartz		Hornfels		CCS		Dolerite		'Other'		Total
Layer	n	%	n	%	n	%	n	%	n	%	
					Waste						
1	8	8,00	76	76,00	2	2,00	14	14,00	—	—	100
2	52	4,69	939	84,67	4	0,36	111	10,00	3	0,27	1109
3	60	1,27	4239	89,62	16	0,34	327	6,91	88	1,86	4730
4	7	0,53	1251	95,35	3	0,23	47	3,58	4	0,30	1312
5	22	0,61	3517	97,32	20	0,55	53	1,47	2	0,06	3614
6	2	0,04	4564	97,75	12	0,26	75	1,61	16	0,34	4669
7	1	0,02	5514	97,96	41	0,73	55	0,98	18	0,32	5630
8	10	0,52	1695	88,33	91	4,74	118	6,15	5	0,26	1919
9	35	1,01	3189	91,74	75	2,16	150	4,32	27	0,78	3476
10	272	6,79	2653	66,28	287	7,17	785	19,61	6	0,15	4003
11	—	—	10	83,33	—	—	2	16,67	—	—	12
					Utilised						
1	—	—	2	40,00	—	—	1	20,00	2	40,00	5
2	3	8,11	26	70,27	—	—	3	8,11	5	13,51	37
3	2	2,99	51	76,12	1	1,49	9	13,43	4	5,97	67
4	—	—	7	87,50	—	—	1	12,50	—	—	8
5	—	—	28	93,33	—	—	1	3,33	1	3,33	30
6	—	—	33	84,61	2	5,13	2	5,13	2	5,13	39
7	1	2,94	31	91,18	1	2,94	1	2,94	—	—	34
8	—	—	21	77,78	4	14,81	2	7,41	—	—	27
9	1	3,33	29	96,67	—	—	—	—	—	—	30
10	—	—	18	78,26	2	8,70	3	3,04	—	—	23
11	—	—	—	—	—	—	—	—	—	—	—
					Formal						
1	—	—	21	100,00	—	—	—	—	—	—	21
2	4	2,27	168	95,45	3	1,70	—	—	1	0,57	176
3	2	0,58	328	95,63	7	2,04	3	0,87	3	0,87	343
4	—	—	48	97,96	—	—	1	2,04	—	—	49
5	—	—	83	92,22	6	6,67	—	—	1	1,11	90
6	—	—	103	97,17	3	2,83	—	—	—	—	106
7	—	—	101	92,66	7	6,42	—	—	1	0,92	109
8	1	1,45	60	86,76	8	11,59	—	—	—	—	69
9	—	—	56	93,33	4	6,67	—	—	—	—	60
10	5	7,35	33	48,53	24	35,29	1	1,47	5	7,35	68
11	—	—	2	66,67	1	33,33	—	—	—	—	3
					Total Layer						
1	8	6,35	99	78,57	4	1,59	15	11,90	2	1,59	126
2	59	4,47	1133	85,77	7	0,53	114	8,63	9	0,68	1322
3	64	1,25	4618	89,84	24	0,47	339	6,60	95	1,85	5140
4	7	0,51	1306	95,40	3	0,22	49	3,58	4	0,29	1369
5	22	0,59	3628	97,16	26	0,70	54	1,45	4	0,11	3734
6	2	0,04	4700	97,63	17	0,35	77	1,60	18	0,37	4814
7	2	0,03	5647	97,82	49	0,85	56	0,97	19	0,33	5733
8	11	0,55	1776	88,14	103	5,11	120	5,96	5	0,25	2015
9	36	1,01	3277	91,81	79	2,22	150	4,21	27	0,76	3566
10	277	6,77	2704	66,05	313	7,65	789	19,27	11	0,27	4094
11	—	—	12	80,00	1	6,67	2	13,33	—	—	15

TABLE 3

Nkupe Shelter: raw material composition of the scraper, adze and backed piece formal tools classes.

	Quartz		Hornfels		CCS		Dolerite		'Other'		**Total**
Layer	n	%	n	%	n	%	n	%	n	%	
					Scrapers						
1	—	—	4	100,00	—	—	—	—	—	—	4
2	4	13,33	25	83,33	1	3,33	—	—	—	—	30
3	—	—	24	85,71	3	10,71	1	3,57	—	—	28
4	—	—	6	100,00	—	—	—	—	—	—	6
5	—	—	34	85,00	5	12,50	—	—	1	2,50	40
6	—	—	40	93,02	3	6,98	—	—	—	—	43
7	—	—	44	88,00	6	12,00	—	—	—	—	50
8	1	3,85	20	76,92	5	19,23	—	—	—	—	26
9	—	—	28	93,33	2	6,67	—	—	—	—	30
10	2	7,14	22	78,57	4	14,29	—	—	—	—	28
11	—	—	2	100,00	—	—	—	—	—	—	2
					Adzes						
1	—	—	14	100,00	—	—	—	—	—	—	14
2	—	—	122	99,19	1	0,81	—	—	—	—	123
3	—	—	276	99,64	1	0,36	—	—	—	—	277
4	—	—	34	97,14	—	—	1	2,36	—	—	35
5	—	—	37	100,00	—	—	—	—	—	—	37
6	—	—	51	100,00	—	—	—	—	—	—	51
7	—	—	42	100,00	—	—	—	—	—	—	42
8	—	—	22	100,00	—	—	—	—	—	—	22
9	—	—	9	100,00	—	—	—	—	—	—	9
10	—	—	—	—	—	—	—	—	—	—	—
11	—	—	—	—	1	100,00	—	—	—	—	1
					Backed Pieces						
1	—	—	2	100,00	—	—	—	—	—	—	2
2	—	—	3	75,00	1	25,00	—	—	—	—	4
3	2	28,57	3	42,88	2	28,57	—	—	—	—	7
4	—	—	1	100,00	—	—	—	—	—	—	1
5	—	—	1	50,00	1	50,00	—	—	—	—	2
6	—	—	—	—	—	—	—	—	—	—	—
7	—	—	4	80,00	1	20,00	—	—	—	—	5
8	—	—	15	93,75	1	6,25	—	—	—	—	16
9	—	—	17	89,47	2	10,53	—	—	—	—	19
10	3	9,38	7	21,88	20	62,50	—	—	2	6,25	32
11	—	—	—	—	—	—	—	—	—	—	—

represented in Layers 1–4 and 'other' in Layers 1–3. These phenomena are clearly associated with the increased proportions in the upper layers of grindstones, rubbers and ochred slabs, for all these utilised artefacts are on either dolerite, shale or sandstone.

Over 85 % of the formal tools in all the layers, excluding Layer 10, are made of hornfels. In Layer 10, where hornfels constitutes only 49 % of the formal tools, CCS (in particular), quartz ana 'other' are better represented than in any other layer. CCS formal tools occur in all the layers, save Layers 1 and 4, and, as in the utilised category, they are generally substantially better represented in this category than their total representation.

The high CCS formal tool proportions in Layer 10 are largely due to over 60 % of the backed pieces, which comprise 47 % of Layer 10's formal tools (Table 4), being made from this raw material (Table 5). Furthermore, close examination of Table 5, which presents a detailed breakdown of the raw material composition of the backed pieces, reveals that out of the 23 segments recovered from Layer 10, 14 (60,87 %) are on CCS, five (21,74 %) on hornfels, three (13,04 %) on quartz, and one (4,35 %) on quartzite. In the overlying layer the picture is reversed, with

five of the six segments (83,33 %) of hornfels and the remaining one of CCS. Thereafter, however, the only segment recovered from Layer 8 is of CCS; in Layer 5 there is one segment of each of CCS and hornfels and in Layer 3 there are two CCS segments and one quartz segment. Although CCS has been used in the manufacture of other types of backed pieces, there seems to be a preference for it to have been used for segments.

The adzes are totally dominated by hornfels—in fact, only three of the 607 adzes recovered from this site were not from hornfels (Table 3). The scrapers are also dominated by hornfels, which generally comprise over 80 % of them (Table 3). After hornfels, CCS was the next most popular raw material for the manufacture of scrapers, and, as with the backed pieces, its representation in this type is far greater than its total site representation.

Of the remaining formal tools, the borers in Layer 2 were made from hornfels as were the grooved stone in Layer 3 and the broken ground stone ring in Layer 6. The raw material composition of the ground stone is as follows: Layer 2—one shale; Layer 3—three dolerite, one shale and one sandstone; Layer 7—one sandstone; and Layer 10—three shale, one hornfels and one dolerite.

The total artefact and backed piece assemblages are presented in Tables 4 and 5 respectively. A selection of adzes, scrapers and backed pieces is illustrated in Fig 14–17.

Waste: comprises over 95 % of Layers 4–10 assemblages, slightly over 90 % of the Layer 3 assemblages and around 80 % of Layers 1 and 2 assemblages. In all the layers, chips, chunks and flakes totally dominate this category, comprising 99 % or more of the waste, with the remainder either cores or grindstone fragments.

Utilised pieces: comprises less than 1,5 % of the artefacts in all the layers except Layers 1 and 2 where they are 3,97 and 2,80 % respectively. Utilised flakes are the most common of the utilised pieces, especially in Layers 5–7. No utilised flakes occur in Layer 1 however. Following utilised flakes in abundance are pièces esquillées, which are most common in the lower levels, particularly Layers 8—10. Rubbers and grindstones (lower) only occur in Layers 1–4 with the exception of the two grindstones recovered from Layer 6. Ochre stones occur in most layers but are most common in Layers 2 and 3, whilst there is a reamer in Layer 2, a chopping implement in Layer 8, and a roofspall with a ground surface in Layer 5.

Formal tools: comprises between 1–4 % of the artefacts in Layers 4–10, but increase thereafter and are 7 % of the Layer 3 artefacts and even higher in Layers 1 and 2, being 13 % and 17 % respectively.

As in the other Thukela Basin sites, adzes, scraper/adzes and backed pieces dominate the formal tools, and at Nkupe Shelter combined they comprise over 90 % in all the layers. The changing adze, scraper and backed piece proportions are illustrated in Fig. 18, and a clear pattern emerges. In Layers 9 and 10 there are more scrapers than adzes, in Layers 5–8 they occur in more or less equal amounts but thereafter adzes are substantially more abundant than scrapers. Backed pieces are most common in Layer 10, comprising almost 50 % of the formal tools, but thereafter their proportions drop considerably. No backed pieces were recovered from Layer 6 and in Layers 2–5 they are less than 3 % of

TABLE 4

Nkupe shelter: stone artefact frequencies.

	Layer 1			Layer 2			Layer 3			Layer 4			Layer 5		
	n	% Category	% Layer Total	n	% Category	% Layer Total	n	% Category	% Layer Total	n	% Category	% Layer Total	n	% Category	% Layer Total
Waste															
Chips, chunks and flakes	99	99,00		1103	99,46		4720	99,79		1312	100,00		3608	99,83	
Cores	1	1,00		6	0,54		10	0,21		—	—		5	0,14	
Grindstone fragments	—	—		—	—		—	—		—	—		1	0,03	
Total	100		79,37	1109		83,89	4730		92,02	1312		95,84	3614		96,79
Utilised															
Pièces esquillées	2	40,00		6	16,22		8	11,94		1	12,50		1	3,33	
Utilised flakes	—	—		23	62,16		49	73,13		6	75,00		27	90,00	
Rubbers	1	20,00		1	2,70		—	—		1	12,50		—	—	
Grindstones	2	40,00		4	10,81		5	7,46		—	—		—	—	
Ochre stones	—	—		2	5,41		5	7,46		—	—		1	3,33	
Reamer	—	—		1	2,70		—	—		—	—		—	—	
Chopper	—	—		—	—		—	—		—	—		—	—	
Spall with ground surface	—	—		—	—		—	—		—	—		1	3,33	
Total	5		3,97	37		2,80	67		1,30	8		0,58	30		0,80
Formal															
Scrapers	4	19,04		30	17,05		28	8,16		6	12,24		40	44,44	
Scraper/Adzes	1	4,76		8	4,55		17	4,96		5	10,20		5	5,56	
Backed pieces	2	9,52		4	2,27		7	2,04		1	2,04		2	2,22	
Adzes	14	66,67		123	69,89		277	80,76		35	71,43		37	41,11	
Borers	—	—		3	1,70		—	—		—	—		—	—	
Ground stones	—	—		1	0,57		5	1,46		—	—		—	—	
Ground stone ring	—	—		—	—		—	—		—	—		—	—	
Grooved stone	—	—		—	—		1	0,29		—	—		—	—	
Miscellaneous retouched pieces	—	—		7	3,98		8	2,33		2	4,08		6	6,67	
Total	21		16,67	176		13,31	343		6,67	49		3,58	90		2,41
Layer total	126			1322			5140			1369			3734		

TABLE 4 (*continued*)

Layer 6			Layer 7			Layer 8			Layer 9			Layer 10			Layer 11		
n	% Category	% Layer Total	n	% Category	% Layer Total	n	% Category	% Layer Total	n	% Category	% Layer Total	n	% Category	% Layer Total	n	% Category	% Layer Total
4664	99,89		5621	99,84		1914	99,74		3471	99,86		3992	99,73		12	100,00	
5	0,11		8	0,14		4	0,21		4	0,12		11	0,27		—	—	
—	—		1	0,02		1	0,05		1	0,03		—	—		—	—	
4669		96,99			97,52	1919		95,23	3476		97,48	4003		97,78	12		80,00
2	5,13		2	5,88		7	25,93		13	43,33		3	13,04		—	—	
34	87,18		31	91,18		18	66,67		17	56,67		19	82,61		—	—	
—	—		—	—		—	—		—	—		—	—		—	—	
2	5,13		—	—		—	—		—	—		—	—		—	—	
1	2,56		1	2,94		1	3,70		—	—		1	4,34		—	—	
—	—		—	—		—	—		—	—		—	—		—	—	
—	—		—	—		1	3,70		—	—		—	—		—	—	
—	—		—	—		—	—		—	—		—	—		—	—	
39		0,81	34		0,59	27		1,34	30		0,84	23		0,56	—		—
43	40,57		50	45,87		26	37,68		30	50,00		28	41,18		2	66,67	
9	8,49		7	6,42		—	—		1	1,67		1	1,47		—	—	
—	—		5	4,59		16	23,19		19	31,67		32	47,05		—	—	
51	48,11		42	38,53		22	31,88		9	15,00		—	—		1	33,33	
—	—		—	—		—	—		—	—		—	—		—	—	
—	—		1	0,92		—	—		—	—		5	7,35		1	—	
1	0,94		—	—		—	—		—	—		—	—		—	—	
—	—		—	—		—	—		—	—		—	—		—	—	
2	1,89		4	3,67		5	7,25		1	1,67		2	2,94		—	—	
106		2,20	109		1,89	69		3,42	60		1,68	68		1,66	3		20,00
4814			5773			2015			3566			4094			15		

TABLE 5
Nkupe Shelter: raw material composition of the backed piece types.

Layer	Segments	Points	Blades	Miscellaneous
1	—	—	—	2 hornfels
2	—	—	1 CCS	3 hornfels
3	2 CCS 1 quartz	1 hornfels	—	2 hornfels 1 quartz
4	—	—	—	1 hornfels
5	1 CCS 1 hornfels	—	—	—
6	—	—	—	—
7	—	2 hornfels	1 CCS 1 hornfels	1 hornfels
8	1 CCS	4 hornfels	9 hornfels	2 hornfels
9	5 hornfels 1 CCS	2 hornfels	6 hornfels	4 hornfels 1 CCS
10	3 quartz 1 quartzite 5 hornfels 14 CCS	1 CCS	—	2 hornfels 1 quartz 5 CCS

the formal tools. Backed piece proportions rise in Layer 1 but they are still less than 10 %.

Besides these formal tools and miscellaneous retouched pieces, which generally vary between 2–7 % of the formal tools, only four other types are represented. These are: borers in Layer 2; ground stones in Layers 2, 3, 7 and 10; a broken ground stone ring in Layer 6, and a grooved stone in Layer 3.

The composition of the backed piece assemblages is presented in Table 6. In Layer 10, in which backed pieces are the most common formal tool, segments dominate, comprising 72 % of the backed pieces. In a period of less than a thousand years (Layer 10 = 6650 BP and Layer 9 = 5760 BP), segment proportions drop from about three-quarters to a third of the backed pieces, and this correlates with an increase in backed points and blades, especially the latter. This general trend of decreasing segment and high backed point and blade proportions continues in Layers 7 and 8. No backed pieces were recovered from Layer 6. In Layer 5 and above, however, backed points and blades are poorly represented and overall there are more segments than these two types combined. Miscellaneous backed pieces, which comprise between 19–26 % of the Layers 7–10 backed pieces, are absent in Layers 5 and 6, but then are between 43 % and 100 % of Layers 1–4 backed pieces.

Analysing the trends for segments above Layer 9 is of interest. They are poorly represented in Layer 8 (6,25 %), absent in Layers 6 and 7, but then is the only type of backed piece represented in Layer 5, which is dated to 3950 BP. In Layer 4 there is only one backed piece, a miscellaneous backed piece, in Layer 3 segments comprise about 40 % of the backed pieces, but they do not occur in Layers 1 and 2. Thus, it would seem that the reappearance of segments at this site after *ca* 5250 BP is restricted to the 2000–4000 BP period.

Comparison of the formal tool assemblages from sites throughout the Thukela Basin has pointed to a correlation between high segment and ground stone proportions (Mazel 1987*b*). Though this correlation is not well developed at this site,

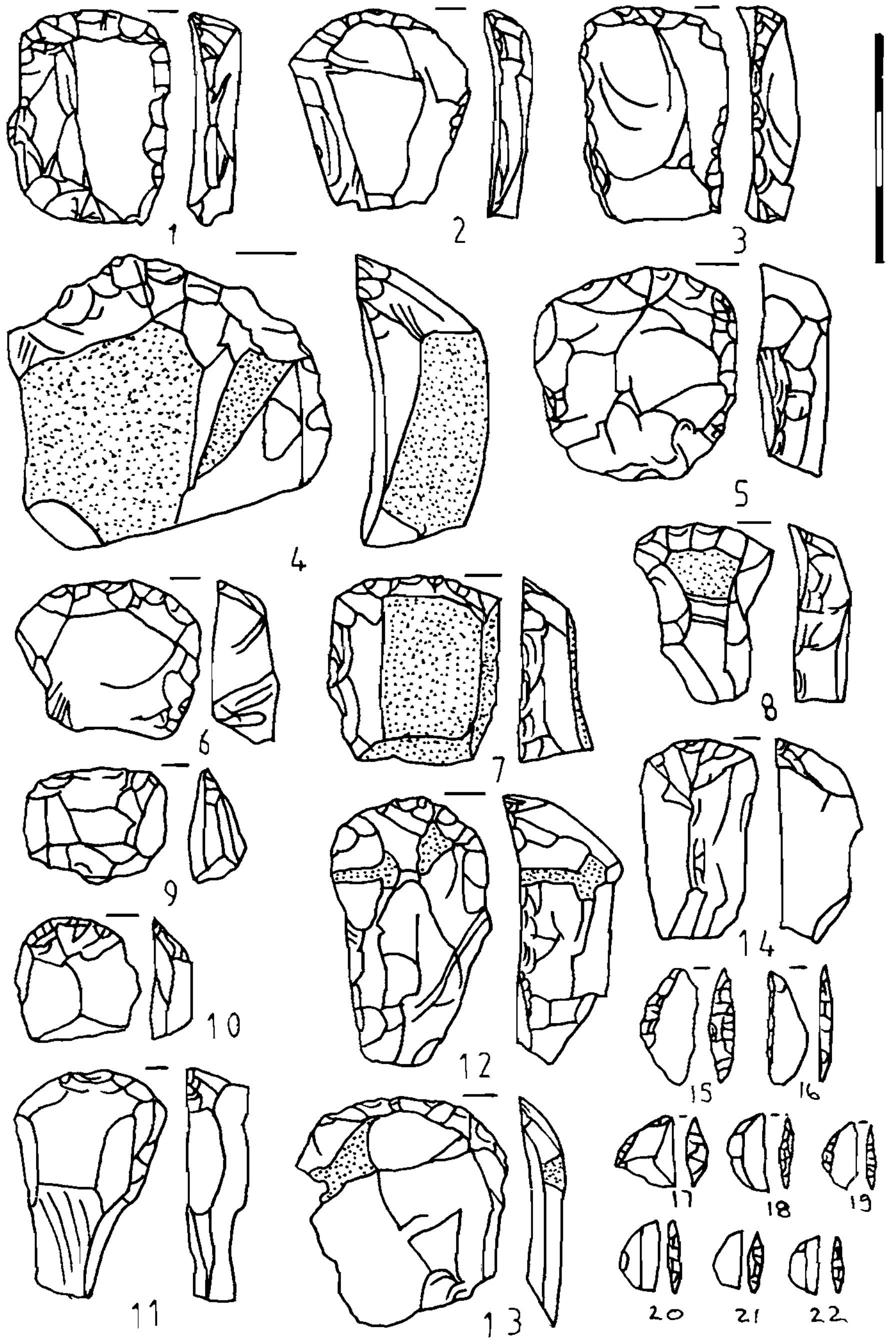

Fig. 14. Nkupe Shelter: Scrapers. Layer 3, 1–3; Layer 4, 4; Layer 5, 5; Layer 6, 6 & 7; Layer 7, 8; Layer 9, 9 & 10; Layer 10, 11–13. Backed pieces. Layer 5, 15; Layer 8, 16; Layer 10, 17–22. All the backed pieces are segments except 16 which is a backed point. All the scrapers and backed pieces 15–17 are from hornfels and backed pieces 18–22 are from CCS (scale in centimetres).

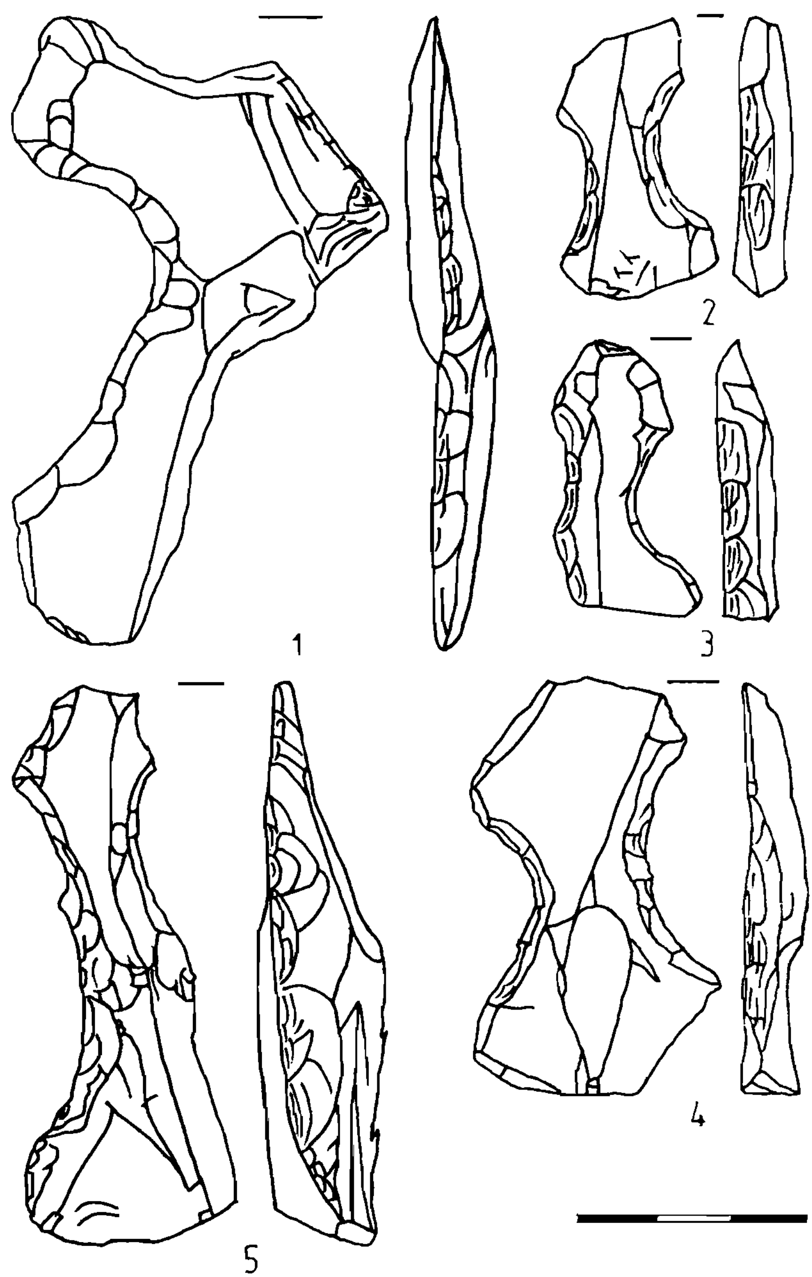

Fig. 15. Nkupe Shelter: Adzes. Layer 3, 1–5. All from hornfels (scale in centimetres).

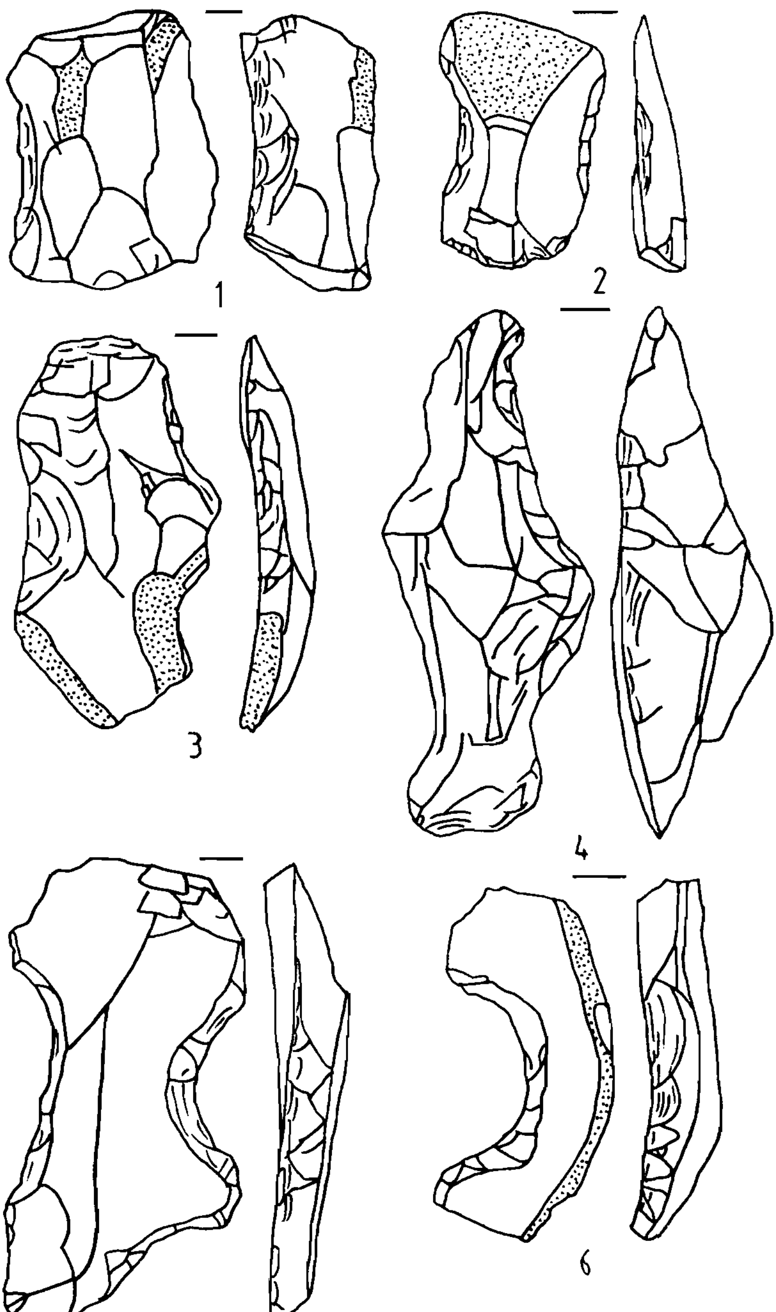

Fig. 16. Nkupe Shelter: Adzes. Layer 3, 5 & 6; Layer 4, 3 & 4; Layer 5, 1 & 2. All from hornfels (scale in centimetres).

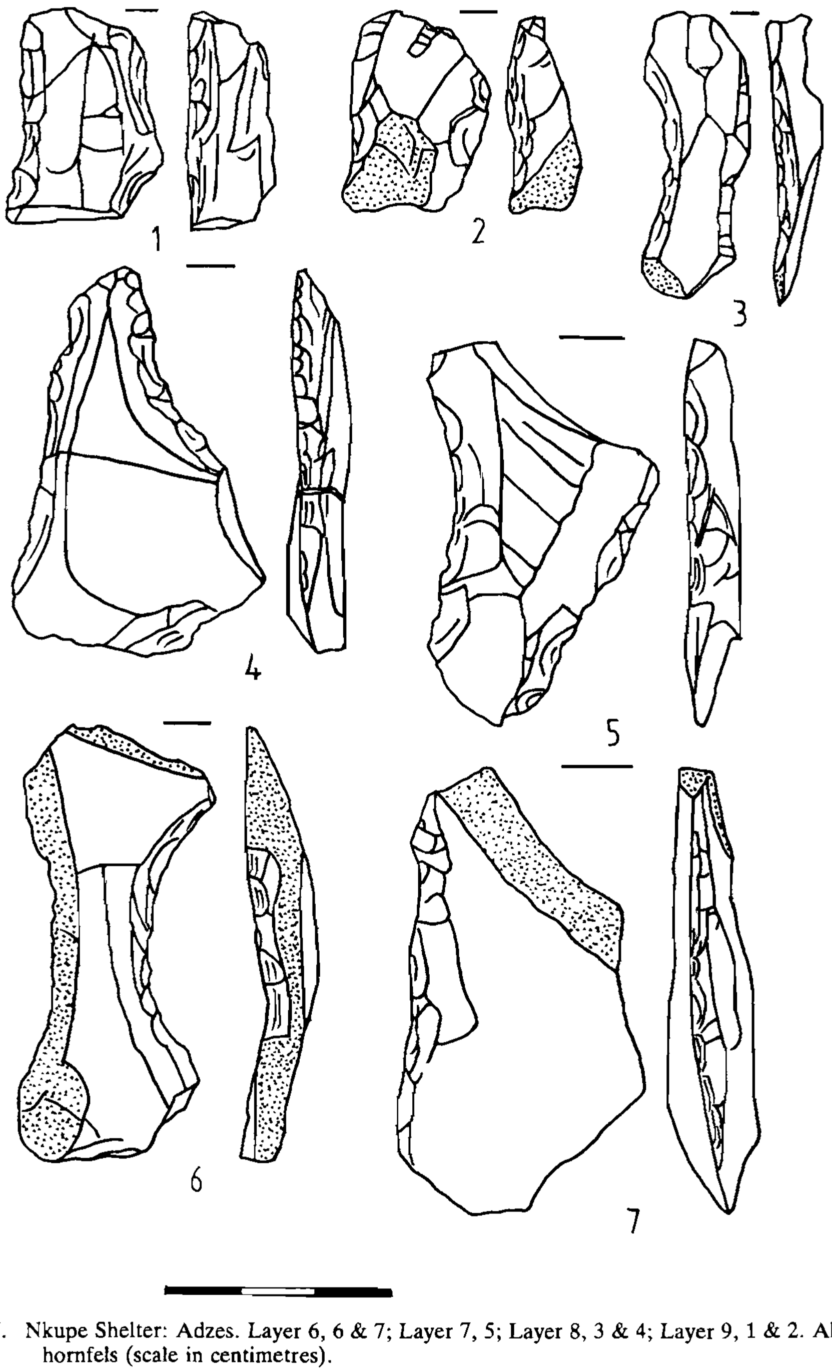

Fig. 17. Nkupe Shelter: Adzes. Layer 6, 6 & 7; Layer 7, 5; Layer 8, 3 & 4; Layer 9, 1 & 2. All from hornfels (scale in centimetres).

it is none the less of significance that in both Layers 3 and 10 segments and ground stones occur in comparatively high proportions.

Backed scrapers occur throughout the sequence excluding Layer 8 (Table 7). They are best represented in Layer 10 (29 %) but then decrease considerably to 10 % in Layer 9 and are absent from Layer 8. Thereafter, and excluding Layer 2 where they are 7 % of the scrapers, they vary between 10 and 25 %. Close examination of Table 7 reveals: firstly, that in Layer 10 scrapers backed along two laterals perpendicular to the working edge represent about 75 % of the backed scrapers; secondly, that scrapers backed across from the working edge occur only in Layers 7 and 9; and, thirdly, that in Layer 7 and the overlying layers, scrapers backed along one lateral perpendicular to the working edge are best represented.

It is only in Layers 3 and 4, where adzes are most common (Table 5, Fig. 18), that there are more double than single notched adzes (Table 8). In the layers adjacent to these two, thus Layers 2 and 5, 46 % and 35 % of the adzes respectively have two notches. In all the other layers, less than 30 % of the adzes have two notches, with a large majority containing only one notch. The large proportion of double notched edges in Layers 2–5, but particularly Layers 3 and 4, further accentuates the adze dominance of the formal tools in the upper layers at this site. Indeed, if we were to use the frequency of working edge as the criterion for measuring formal tool frequencies, adzes would comprise considerably more than the 71 and 81 % they already comprise of Layers 3 and 4 formal tools respectively.

The proportion of broken adzes was also recorded and is as follows: Layer 1—50 %; Layer 2—52 %; Layer 3—64 %; Layer 4—53 %; Layer 5—38 %; Layer 6—27 %; Layer 7—55 %; and Layer 9—56 %. Thus in all the layers excluding Layers 5 and 6, half or over half the adzes recovered were broken.

Scrapers, adzes and segments were analysed metrically. The results of the scraper analysis are presented both for all the scrapers and for the hornfels scrap-

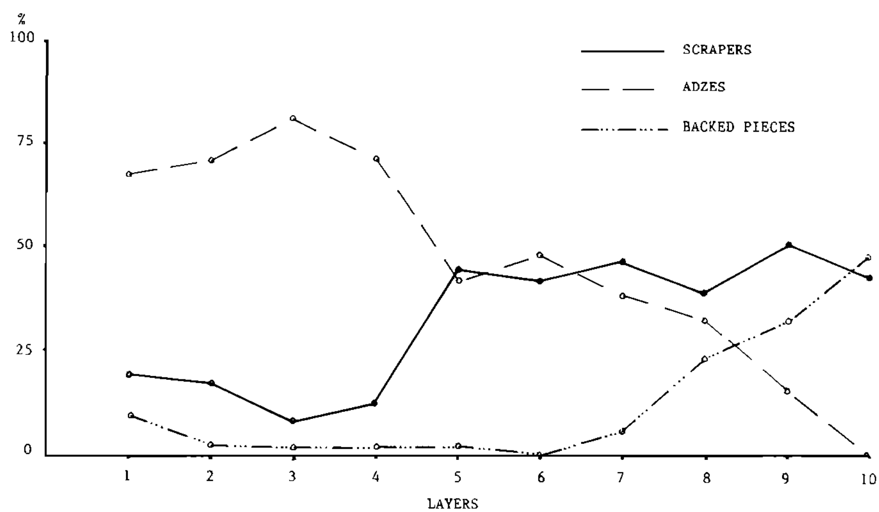

Fig. 18. Nkupe Shelter: changing scraper, adzes and backed piece proportions.

TABLE 6
Nkupe Shelter: composition of backed piece assemblage.

Layer	Backed points		Backed blades		Segments		Miscellaneous backed		Total
	n	%	n	%	n	%	n	%	
1	—	—	1	50,00	—	—	1	50,00	2
2	—	—	1	25,00	—	—	3	75,00	4
3	1	14,29	—	—	3	42,86	3	42,86	7
4	—	—	—	—	—	—	1	100,00	1
5	—	—	—	—	2	100,00	—	—	2
6	—	—	—	—	—	—	—	—	—
7	2	40,00	2	40,00	—	—	1	20,00	5
8	3	18,75	9	56,25	1	6,25	3	18,75	16
9	2	10,53	6	31,58	6	31,58	5	26,32	19
10	1	3,13	—	—	23	71,88	8	25,00	32

TABLE 7
Nkupe Shelter: frequency and nature of backed scrapers. Type 1 scrapers backed across from working edge; Type 2 scrapers backed along one lateral perpendicular to working edge; Type 3 scrapers backed along two laterals perpendicular to the working edge; and Type 4 backed scrapers backed opposite to working edge and along one lateral perpendicular to working edge.

	1		2		3		4		Total Backed	Total Scrapers	% Backed
Layer	n	%	n	%	n	%	n	%			
1	—	—	1	100,00	—	—	—	—	1	4	25,00
2	—	—	1	50,00	1	50,00	—	—	2	30	6,67
3	—	—	3	60,00	2	40,00	—	—	5	28	17,86
4	—	—	1	100,00	—	—	—	—	1	6	16,67
5	—	—	3	75,00	1	25,00	—	—	4	40	10,00
6	—	—	5	55,56	4	44,44	—	—	9	43	20,93
7	2	22,22	4	44,44	3	33,33	—	—	9	50	18,00
8	—	—	—	—	—	—	—	—	—	26	—
9	2	66,67	—	—	—	—	1	33,33	3	30	10,00
10	—	—	2	25,00	6	75,00	—	—	8	28	28,57
11	—	—	—	—	—	—	—	—	—	2	—

TABLE 8
Nkupe Shelter: frequency of the number of notches per adze.

Layer	Number of notches										Total
	1		2		3		4		?		
	n	%	n	%	n	%	n	%	n	%	
1	10	71,43	4	28,57	—	—	—	—	—	—	14
2	61	49,59	57	46,34	3	2,44	2	1,63	—	—	123
3	71	25,63	163	58,84	11	3,97	—	—	32	11,55	277
4	6	17,14	23	65,71	2	5,71	1	2,86	3	8,57	35
5	22	59,46	13	35,14	—	—	—	—	2	5,41	37
6	40	78,43	7	13,73	—	—	—	—	4	7,84	51
7	32	76,19	7	16,67	—	—	—	—	3	7,14	42
8	14	63,64	6	27,27	1	4,55	—	—	1	4,55	22
9	8	88,89	1	11,11	—	—	—	—	—	—	9
10	—	—	—	—	—	—	—	—	—	—	0
11	—	—	1	100,00	—	—	—	—	—	—	1

ers only (Figs 19–20). There are insufficient quartz and CCS scrapers to warrant individual attention. The total scraper and hornfels scraper mean dimensions are similar and they also reflect identical temporal patterning. Both scraper mean lengths and widths decrease substantially from Layer 10 to Layer 9, thereafter they both increase to Layer 6, then decrease again to Layer 5, increase to Layer 4 and then in Layers 1–3 decrease consistently. The initial decrease in mean length and width is probably related to the decreasing proportion between Layers 10 and 9 of scrapers backed along two laterals perpendicular to the working edge. Indeed, there are none of these backed scrapers in Layers 8 and 9, which combined contain only three backed scrapers.

The overall Layers 9 and 10 scraper mean heights vary considerably, being 4,13 mm and 6,58 mm respectively, but thereafter they even out and in Layers

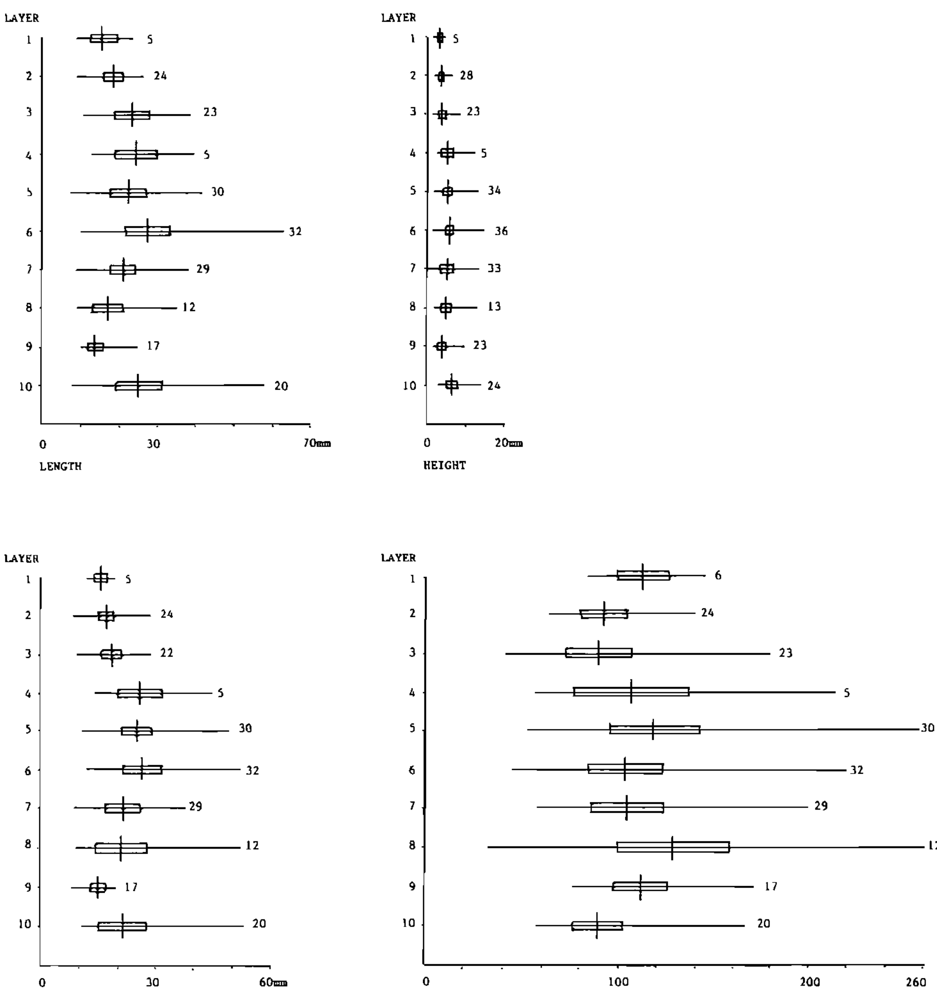

Fig. 19. Nkupe Shelter: Dice-Leraas diagram of overall scraper dimensions.

4–8 vary between 5 and 6 mm and in Layers 1–3 between 3 and 4 mm. As with the scraper mean length and widths, the hornfels scraper mean heights are almost exactly the same as those for all the scrapers in the different layers.

The overall and hornfels scraper width/length ratios show no consistent pattern, fluctuating substantially throughout the sequence. The scrapers in Layers 2, 3 and 10 are most elongate and those in Layer 8 are most squat, the rest falling somewhere between them.

No raw material distinctions have been made in the metrical analysis of adzes as

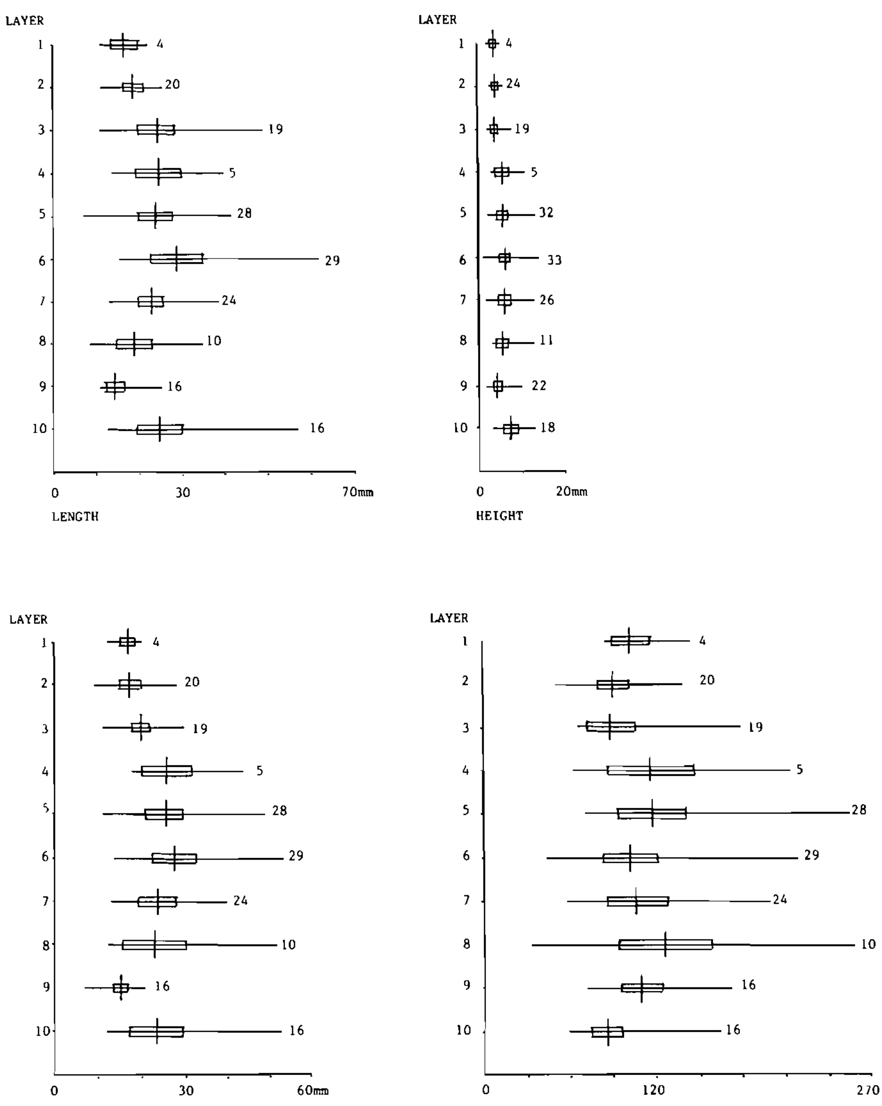

Fig. 20. Nkupe Shelter: Dice-Leraas diagram of hornfels scraper dimensions.

all but three are on hornfels. Greater patterning is evident among the adzes than among the scrapers (Fig. 21). In Layer 9 the adzes are short and narrow but thereafter they increase in both mean length and width to Layer 6. Above this layer they decrease slightly in mean length and width to Layer 5 but they then increase in both parameters to Layer 4 where they reach their largest mean dimensions. As with the scrapers, adze mean widths and lengths decrease consistently above Layer 4. The width/length ratios of the adzes in the lower layers (7–9) fluctuate considerably but thereafter they stabilise and vary between 61–67. Adze mean heights vary between 6 (Layer 1) and 11 mm (Layer 6) but no temporal patterning is discernible, except perhaps that adzes are thickest in the middle layers (4–6).

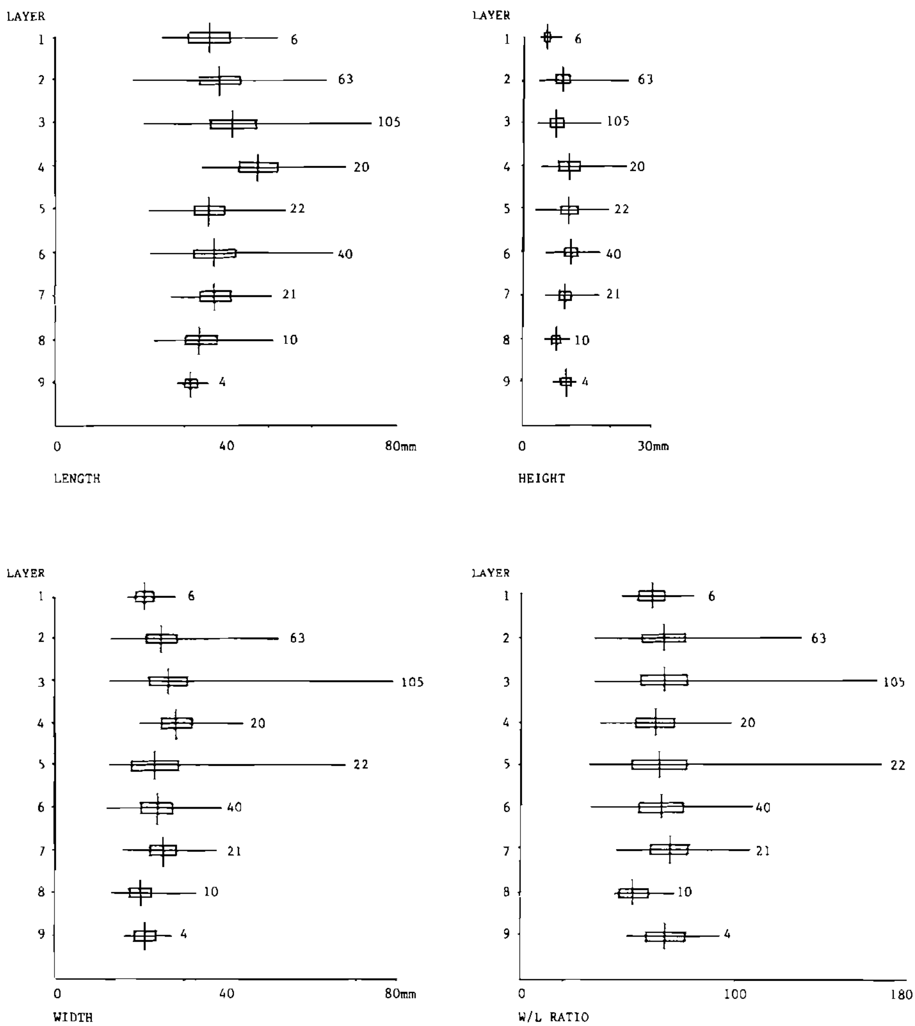

Fig. 21. Nkupe Shelter: Dice-Leraas diagram of adzes dimensions.

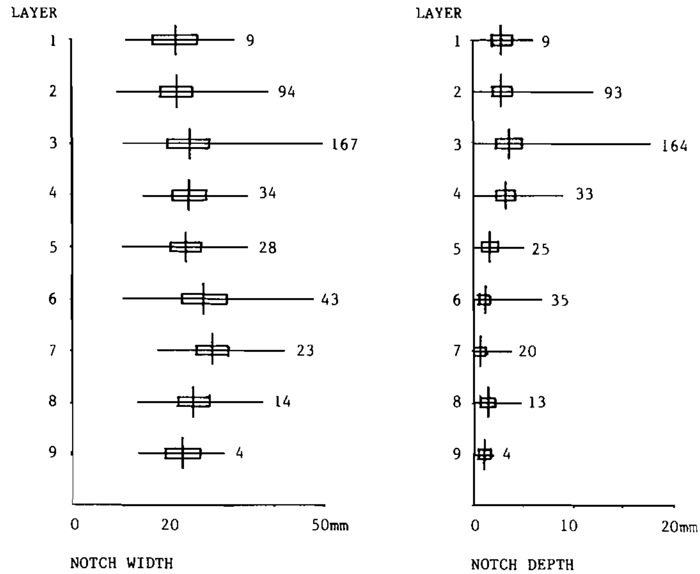

Fig. 22. Nkupe Shelter: Dice-Leraas diagram of means adze Notch width and depth dimensions. The minimum notch depths reaching zero is explained by the fact that some adzes had straight working edges.

The mean depth and width of the adze notches were also calculated (Fig. 22). The mean notch depth of adzes in Layers 5–9 vary between 0,5 and 2 mm but they increase substantially in the overlying layers and vary between 2,9 and 4 mm. The mean notch width in all the layers except Layers 6 and 7 vary between 20–24 mm and in Layers 6 and 7 are 26 and 28 mm respectively.

The Layers 9 and 10 segments were measured and the results are as follows: Layer 9 mean width = 5,8 mm (SD = 0,84 mm, n = 5); Layer 10 mean width = 4,58 (SD = 1,42, n = 19); Layer 9 mean length = 7,4 mm (SD = 1,52 mm, n = 5); and Layer 10 mean length = 8,45 mm (SD = 1,52 mm, n = 19).

Ochre and graphite

Ochre was recovered from all the layers except Layer 1, and was present in the following quantities: Layer 2—5 pieces; Layer 3—94 pieces; Layer 4—12 pieces; Layer 5—17 pieces; Layer 6—21 pieces; Layer 7—4 pieces; Layer 8—55 pieces; Layer 9—52 pieces; Layer 10—26 pieces; and Layer 11—1 piece. Ochre is thus best represented in Layers 3, 8 and 9. Ground ochre was recovered from Layers 5 (four pieces) and 8 (one piece). Ochre stones occur in most layers but are most abundant in Layers 2 and 3 (Table 4). In addition, ochre staining was noticed on a dolerite core in Layer 3 and a grindstone fragment in Layer 8.

One piece of graphite was recovered from each of Layers 2 and 5.

Pottery

Twelve pieces of pottery were recovered from Layers 1 and 2, and information on them is presented in Table 9. The absence of diagnostic features such as dec-

TABLE 9
Nkupe Shelter: pottery assemblage.

Layer	Thickness (mm)	Colour	Burnish
1	13	grey	—
	broken	orange	—
2	8	grey	red
	5	grey	ordinary
	8	grey	ordinary
	10	grey	ordinary
	10	grey	—
	13	grey	—
	8	grey	—
	broken	grey	—
	broken	grey	—
	15	grey	—

oration, rim sherds, and the ability to determine shape precludes further comment on this assemblage and thus disallows comparisons between it and other assemblages.

Worked bone

Nkupe Shelter produced an extremely large worked bone assemblage, perhaps one of the largest assemblages so far recovered from a South African LSA hunter–gatherer context. In all, some 406 pieces were recovered from Layers 1–10 (Table 10). No worked bone was recovered from Layer 11. Some of the worked bone is illustrated in Figs 23 & 24.

A coarser division of the types is used in Table 11 to facilitate a simpler comparison. A clear temporal patterning is evident in the proportions of awls and points/linkshafts, the most common diagnostic types. Awl proportions are highest in the lower layers (6–9) whilst points/linkshafts are absent in Layer 9 and comprise less than 10 % of the worked bone in Layers 6–8. Awls decrease considerably between Layers 6 and 5 but are still more prevalent than points/linkshafts, while in Layer 4, which has only 12 pieces, awl proportions increase and they continue to be more common than points/linkshafts which clearly are steadily increasing. The decreasing awl and increasing point/linkshaft proportions continue in the upper layers and in Layers 2 and 3, point/linkshafts are more common than awls which reach their lowest proportions, less than 7 %. Only four pieces of worked bone were recovered from Layer 1.

Spatulae are the next most common worked bone artefacts. They occur in all the layers except Layers 1, 8 and 10 and generally vary between 3 and 10 % of the worked bone. Most of the spatulae are flat, with round ones only occurring in Layers 5–7 (Table 10). These layers also contained the only needle and double awls, the remainder being ordinary awls (Table 10).

Fish hooks first appear at this site in Layer 6 which dates to between 4000 and 4500 BP, and thereafter they occur in Layers 3–5, varying between 5–8 % of the worked bone (Fig. 23). Their appearance at Nkupe Shelter at around 4250 BP coincides with their introduction at Mgede Shelter roughly 25 km to the west, in the

TABLE 10

Nkupe Shelter: worked bone assemblage.

	1		2		3		4	
	n	%	n	%	n	%	n	%
Points, whole	—	—	—	—	2	2,15	1	8,33
Points, broken	—	—	2	8,00	11	11,83	1	8,33
Linkshafts, whole	—	—	—	—	1	1,07	—	—
Linkshafts, broken	—	—	1	4,00	5	5,38	—	—
Points or linkshafts, whole	—	—	—	—	—	—	—	—
Points or linkshafts, broken	—	—	2	8,00	8	8,60	1	8,33
Spatulae, flat, whole	—	—	—	—	—	—	—	—
Spatulae, flat, broken	—	—	1	4,00	3	3,23	1	8,33
Spatulae, round, whole	—	—	—	—	—	—	—	—
Spatulae, round, broken	—	—	—	—	—	—	—	—
Scapula, ground	—	—	—	—	—	—	—	—
Awls, whole	1	25,00	—	—	3	3,23	1	8,33
Awls, broken	—	—	1	4,00	3	3,23	3	25,00
Awls, needle	—	—	—	—	—	—	—	—
Awls, double	—	—	—	—	—	—	—	—
Utilised splinters	—	—	2	8,00	—	—	—	—
Fish hooks, whole	—	—	—	—	—	—	—	—
Fish hooks, broken	—	—	—	—	5	5,38	1	8,33
Mini-points	—	—	—	—	—	—	—	—
Rings, broken	—	—	—	—	—	—	—	—
Miscellaneous worked bone	1	25,00	5	20,00	3	3,23	1	8,33
Flaked bone	—	—	—	—	—	—	—	—
Fragments of points, linkshafts or awls	2	50,00	11	44,00	48	51,61	1	8,33
Bone flakes	—	—	—	—	1	1,07	1	8,33
Spoons, whole	—	—	—	—	—	—	—	—
Spoons, broken	—	—	—	—	—	—	—	—
? Modified baboon tooth	—	—	—	—	—	—	—	—
Total	4		25		93		12	

TABLE 10 (*continued*)

5		6		7		8		9		10	
n	%	n	%	n	%	n	%	n	%	n	%
—	—	1	1,15	—	—	—	—	—	—	—	—
1	1,61	4	4,60	1	1,23	1	4,55	—	—	—	—
1	1,61	—	—	—	—	—	—	—	—	—	—
3	4,84	1	1,15	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
3	4,84	1	1,15	4	4,94	1	4,55	—	—	—	—
1	1,61	—	—	—	—	—	—	—	—	—	—
3	4,84	5	5,75	7	8,64	—	—	2	14,29	—	—
1	1,61	1	1,15	—	—	—	—	—	—	—	—
—	—	—	—	1	1,23	—	—	—	—	—	—
1	1,61	—	—	—	—	—	—	—	—	—	—
5	8,06	21	24,14	5	6,17	—	—	—	—	—	—
5	8,06	24	27,59	36	44,44	14	63,64	6	42,87	1	16,67
2	3,23	—	—	1	1,23	—	—	—	—	—	—
—	—	1	1,15	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
1	1,61	—	—	—	—	—	—	—	—	—	—
3	4,84	1	1,15	—	—	—	—	—	—	—	—
—	—	3	3,45	2	2,47	—	—	2	14,29	—	—
—	—	3	3,45	—	—	—	—	—	—	—	—
3	4,84	7	8,05	4	4,94	—	—	2	14,29	1	16,67
2	3,23	—	—	1	1,23	—	—	—	—	—	—
20	32,26	10	11,49	17	20,99	6	27,27	2	14,29	4	66,67
3	4,84	4	4,60	2	2,47	—	—	—	—	—	—
1	1,61	—	—	—	—	—	—	—	—	—	—
2	3,23	—	—	—	—	—	—	—	—	—	—
1	1,61	—	—	—	—	—	—	—	—	—	—
62		87		81		22		14		6	

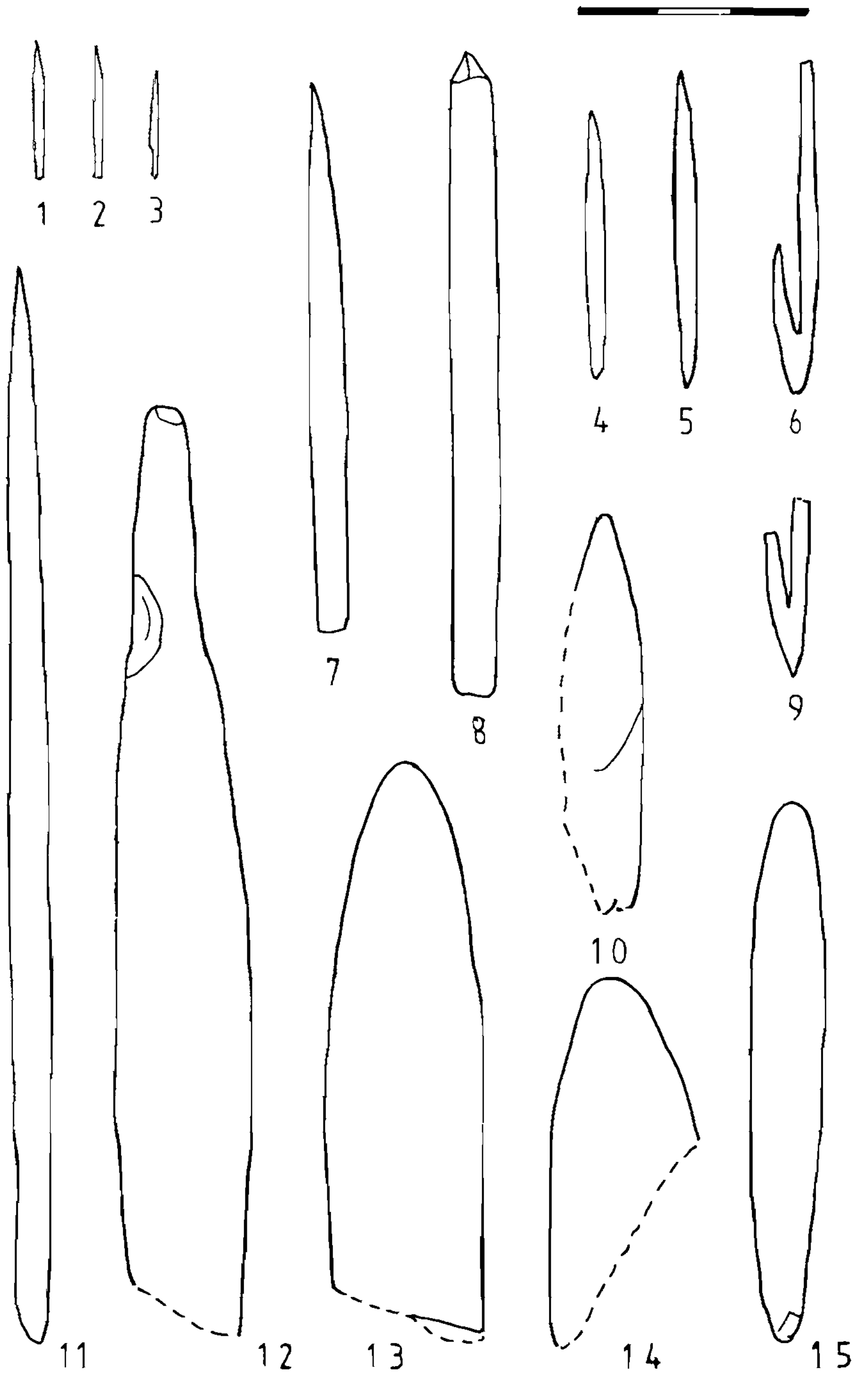

Fig. 23. Nkupe Shelter: Mini-points. Layer 6, 1–3. Points. Layer 3, 4 & 7; Layer 4, 11; Layer 6, 5. Linkshaft. Layer 5, 8. Spatulae. Layer 5, 13 & 15; Layer 6, 10, 12, 14 & 15. Fish hooks. Layer 3, 9; Layer 5, 6. (Scale in centimetres.)

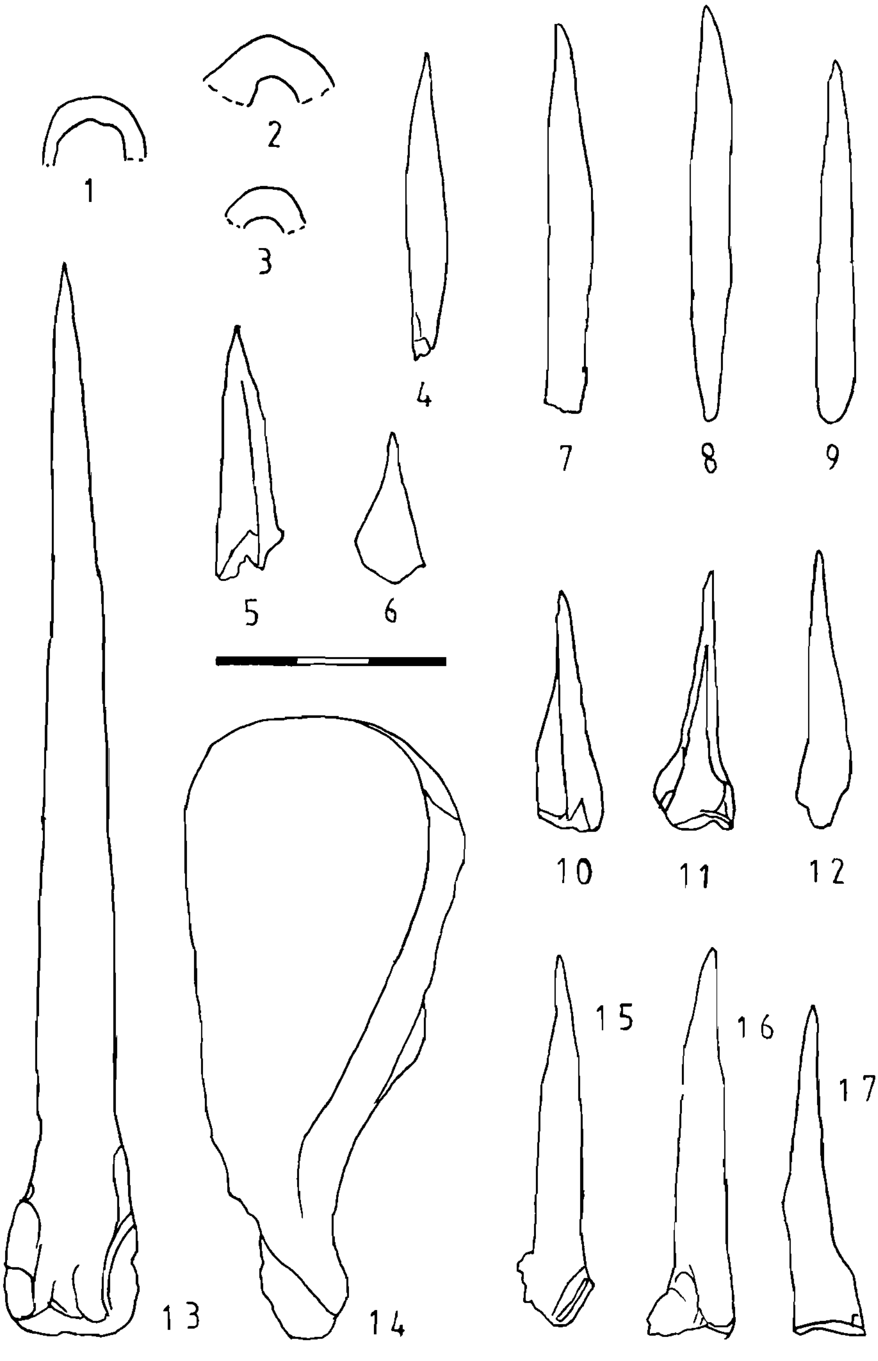

Fig. 24. Nkupe Shelter: Rings Layer 6, 1–3. Spoon. Layer 5, 14. Awls. Layer 5, 6, 11 & 12; Layer 6, 5, 7–9, 13, 16 & 17; Layer 7, 4, 10 & 15. (Scale in centimetres.)

TABLE 11
Nkupe Shelter: coarse division of worked bone assemblage.

	Layer 1		2		3		4		5		6		7		8		9		10	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Points/Linkshafts	—	—	5	20,00	27	29,03	3	24,99	8	12,90	7	8,05	5	6,17	2	9,10	—	—	—	—
Spatulae	—	—	1	4,00	3	3,23	1	8,33	5	8,06	6	6,90	8	9,87	—	—	2	14,29	—	—
Awls	1	25,00	1	4,00	6	6,46	4	33,33	12	19,35	46	52,88	42	51,84	14	63,64	6	42,87	1	16,67
Fragments of Points/ Linkshafts/Awls	2	50,00	11	44,00	48	51,61	1	8,33	20	32,26	10	11,49	17	20,99	6	27,27	2	14,29	4	66,67
Miscellaneous	1	25,00	5	20,00	3	3,23	1	8,33	3	4,84	7	8,05	4	4,94	—	—	2	14,29	1	16,67
Other	—	—	2	8,00	6	6,46	2	16,67	14	22,58	11	12,64	5	6,17	—	—	2	14,29	—	—
Total	4		25		93		12		62		87		81		22		14		6	

4390 BP deposits (Mazel 1986*a*). Not surprisingly fish remains first occur at Nkupe Shelter in Layer 5 (3950 BP) and at Mgede Shelter in the 4390 BP deposits. Thus, there is a good correlation between the appearance of fish hooks and fish remains at these sites.

Mini-points, which vary in length between 13–19 mm (Fig. 23), were recovered from Layers 6, 7 (4590 BP) and 9 (5760 BP). The only other site at which they occur is Mgede Shelter, where they were recovered from the 4390 BP deposits (Mazel 1986*a*).

Particularly interesting items recovered from Layer 5 were two, and possibly three, spoons (Fig. 24). One of the spoons is whole, another is broken but clearly the same item as the whole one, and the third, while broken and not as distinctive as the others, appears enough like them to be considered as a spoon. I know of no other reports of bone spoons from a LSA hunter–gatherer context and thus these may be unique.

The three broken 'rings' from Layer 6 are also of interest. One of them is highly polished and appears to be a ring (Fig. 24 no 1), whilst the other two (Fig. 24 nos 2 & 3) are also polished and perforated, but they are possibly not rings (they have been classified as rings, but may require reclassification at a later stage).

Only one piece of faceted bone was recovered, and significantly this came from the Layer 1 surface deposits. I have concluded elsewhere (Mazel 1986*a* 1987*b*), that faceted bones occur only after 2000 BP in the Thukela Basin, and that their presence may relate to the acquisition of iron implements from the farming communities.

OES pieces and beads

All the layers except Layers 4, 5 and 11 produced pieces of OES (Table 12). While the absence of OES in Layer 11 probably relates to the general paucity of archaeological material in this layer, this cannot account for its absence in Layers 4 and 5. Besides Layers 1 and 2, Layers 6 and 7 contain the next lowest quantities of OES, with only five pieces in each. The greatest concentration of OES derived from Layers 8–10, which combined produced 86 % of the OES recovered from this site. In terms of frequency, Layer 3 produced less OES than any of Layers 8–10, but the presence of OES in Layer 3, even though in low quantities, is of added significance when considering its absence in Layers 4 and 5 and paucity in

TABLE 12
Nkupe Shelter: OES assemblage.

	Burnt		Unburnt		Total	
Layer	n	g	n	g	n	g
1	—	—	1	0,2	1	0,2
2	—	—	1	0,4	1	0,4
3	6	1,2	5	8,7	11	9,9
4	—	—	—	—	—	—
5	—	—	—	—	—	—
6	1	0,1	4	1,1	5	1,2
7	4	0,5	1	0,3	5	0,8
8	16	3,1	12	4,5	28	7,6
9	73	11,4	12	3,5	85	14,9
10	9	1,1	17	2,8	26	3,9

TABLE 13
Nkupe Shelter: bead assemblage.

Layer	OES	Seed	Bone	Cane glass	Total
1	—	—	—	—	—
2	6	—	—	1	7
3	32	1	—	—	33
4	4	—	—	—	4
5	2	—	1	—	3
6	—	—	—	—	—
7	1	—	—	—	1
8	8	—	—	—	8
9	7	—	—	—	7
10	3	—	—	—	3

Layers 6 and 7. An explanation for the temporal distribution of OES has been proposed before (Mazel 1987*b*). None of the OES was decorated, but one piece in each of Layers 2 and 3 shows signs of having been ground.

Beads made from OES, bone, cane glass and a seed were recovered, but all the beads, except three, are of OES (Table 13). The cane glass bead came from Layer 2 and, as mentioned earlier, this supports the conclusion that the Layer 2 deposits date to within the last 2 000 years. Agreeing with this proposition is the fact that the only OES bead to display localised wear in the form of two lines diametrically opposite each other, running from the aperture towards the outer edge, was recovered from Layer 2. Beads displaying this type of wear only occur in the Thukela Basin after 2000 BP (Mazel 1986*a* 1987*b*).

The temporal distribution of OES beads closely resembles that of OES pieces. Layers 8 and 9 have relatively many beads, Layers 4, 5 and 7 fewer and Layer 6 none, and then there is a considerable increase in Layer 3.

Ochre stained OES beads were recovered from Layers 3 (n = 10) and 10 (n = 1). Thus, about a third of the beads in both these layers are ochre stained.

A distinction also emerges between the size of the OES beads in the lower and upper layers. Only one bead in Layers 5–10 was five millimetres in diameter whilst the rest were either three or four millimetres in diameter. In Layers 2–4 combined however, only 14 of the 44 beads (ie. 31,82 %) that were measurable

were three or four millimetres in diameter, and the rest (68,18%) were five or six millimetres in diameter. This distinction is clearly reflected in the mean diameter of beads in those layers containing more than five beads: Layer 2—$\bar{x} = 4{,}67$ mm ($n = 6$, $SD = 0{,}82$ mm); Layer 3–$\bar{x} = 4{,}87$ mm ($n = 31$, $SD = 0{,}76$ mm); Layer 4–$\bar{x} = 4{,}43$ mm ($n = 7$, $SD = 0{,}98$ mm); Layer 8–$\bar{x} = 3{,}65$ mm ($n = 8$, $SD = 0{,}74$ mm); and Layer 9–$\bar{x} = 3{,}85$ mm ($n = 7$, $SD = 0{,}38$ mm).

Other cultural finds

The cultural remains which do not fall under any of the previous headings are listed in Table 14. Evident from this table is that, except for three woodshavings in Layer 4, all the woodshavings were recovered from Layers 1–3, thus within the last 3 190 years. The majority of the woodshavings in Layer 1 (41 out of 47 ie. 87%) appear to have been cut with a sharp metal instrument. The correlation between the temporal distribution of woodshavings and the high adze proportions at this site is of significance.

The Layer 1 worked wood consists of an adiagnostic piece which has been shaved and another which has been smoothed on one side. The piece of worked wood from Layer 2 is 16 cm long and gives the impression of being a peg as it has a tapering point and has signs of being hammered on the top. The Layer 3 piece of worked wood is a broken and very fragile piece of carbonised wood which tapers to a point.

The feathers have not been identified, and in fact may not be identifiable. Thus, it is impossible to speculate on how they were incorporated into the deposit.

The leather recovered from Layers 1 and 2 are both very small folded adiagnostic pieces, which are between two and three centimetres long and roughly one centimetre wide.

The piece of twine in Layer 1 is double-stranded and about three centimetres long. In Layer 3, one piece of twine is very fragile and difficult to assess, another is flattish and about 2,5 cm long and 0,5 cm wide, and another is triple-stranded and 5,5 cm long. The final piece in Layer 3 is actually made up of five identical pieces of thin double-stranded twine which were all recovered from VP 2, S13, and are most likely part of the same piece. Together, these five pieces are 10 cm long. Three knots were also recovered from Layer 3 (VP 2, S13).

Four pieces of modified shell were recovered from Layer 10. Visual and microscopic inspection cannot reveal with certainty whether these come from freshwater or marine mussels (Kilburn & Ward pers. comm.).

TABLE 14
Nkupe Shelter: miscellaneous cultural remains.
None of these items was recovered from below layer 4.

	Feathers	Wood shavings	Worked wood	Leather	Twine
Layer	n	n	n	n	n
1	1	48	2	1	1
2	2	14	1	1	—
3	4	49	1	—	4
4	—	3	—	—	—

FAUNA

Macro- and microfaunal remains were recovered from all the layers (Tables 15–16) and fish bones were recovered from Layers 3–5.

As with the other Holocene LSA faunal assemblages reported from the Thukela Basin (Maggs & Ward 1980, Mazel 1984*b* *c* 1986*a* *b* 1988), the Nkupe Shelter macrofaunal assemblages are dominated by bovids which probably constituted the chief meat protein dietary input. In Layers 6–10 bovids comprise between 52–58 % of the animals identified, except in Layer 7 where they are 40 %; in Layers 3–5 they are between 42–48 % and in Layers 1 and 2 they are 64 % and 53 % respectively.

Among bovids, small and small-medium non-migratory species outnumber the larger migratory species in all the layers, with the latter comprising 25 % and 31 % of the total bovids in Layers 4 and 10 respectively, but not more than 20 % in any of the other layers. Indeed, if one considers the entire bovid assemblage, only 36 out of 238 individuals identified, thus 15 %, are large or large/medium species. Among the larger antelope, wildebeest, roan/sable, and blesbok have been individually identified, whilst among the smaller antelope, mountain reedbuck, oribi, klipspringer, grysbok/steenbok are common.

One domestic animal in the form of a sheep/goat was recovered from Layer 3 and cattle may be represented in Layers 1 and 2 large bovid class as these layers postdate 2000 BP. The presence of a sheep/goat in Layer 3, dated to between 3190 and 2480 BP is anomalous, and may be due to the disturbance of this layer after 2000 BP.

A feature of the faunal remains is the high proportions of carnivores represented, with them varying between 6–17 % of the minimum number of individuals (MNIs). A wide range of carnivores were identified: hunting dog, genet, wildcat, jackal/dog, caracal or serval, leopard and lion. The high carnivore proportions at this site begs the question as to whether some of the other macrofaunal remains are their residue rather than that of humans. This question was also raised by Klein (pers. comm.), especially for the assemblages where carnivores comprise more than 16 % of the MNIs. I have tentatively argued elsewhere (Mazel 1987*b*) that the presence of carnivore remains in relatively high proportions, not only in Nkupe Shelter but also in other Thukela Basin sites, may well be partially the result of their predation by humans. Kalahari hunter–gatherers eat a range of carnivores, including the types presented at Nkupe Shelter (Lee 1979, Silberbauer 1981). It is also possible that carnivores, especially leopards, were hunted for their skins (Brain 1981). Given these points as well as the knowledge that carnivores rarely comprise more than 16 % of any individual layer's MNI and all the Thukela Basin sites produced large cultural assemblages, I propose that humans and not carnivores were primarily responsible for the macrofaunal assemblages and thus the patterns reflected by them.

A trend identified in the Nkupe Shelter faunal remains and those from other Thukela Basin sites (Mazel 1987*b*), is an increased emphasis on dassies and hares up until 2000 BP. At Nkupe Shelter, for example, in Layer 10 dassies and hares combined comprised 23 % of the total MNIs, in Layers 6–9 they are between 16–21 %, and then in Layers 3–5 they are between 24–26 %. After 2000 BP their

TABLE 15
Nkupe Shelter: macrofaunal assemblage.

	Layer 1	2	3	4	5	6	7	8	9	10	11
Leporid (2 spp.) hare(s)	3/1	17/4	126/13	32/4	98/9	73/5	27/4	28/3	15/2	9/2	—
Hystrix africaeaustralis, porcupine	—	4/1	15/2	1/1	21/1	13/2	1/1	2/1	—	—	—
Papio ursinus, baboon	1/1	7/1	114/3	10/2	43/2	17/2	7/1	42/2	9/2	16/2	—
Cercopithecus aethiops, vervet	—	—	1/1	—	—	—	1/1	—	—	—	—
Homo sapiens, people	—	—	—	—	—	1/1	1/1	—	—	—	—
Canis cf. *mesomelas*, black-backed jackal	—	2/1	8/1	4/1	12/2	17/2	12/1	1/1	3/1	—	—
Lycaon pictus, hunting dog	—	—	1/1	—	1/1	—	—	—	—	—	—
Mellivora capensis, honey badger	—	—	2/1	—	—	—	—	—	—	—	—
Aonyx capensis, clawless otter	—	—	—	—	1/1	1/1	7/1	1/1	—	—	—
Genetta sp., genet	—	—	4/1	1/1	5/2	3/2	1/1	—	—	—	—
Atilax paludinosus, water mongoose	—	—	—	—	—	4/1	2/1	1/1	—	1/1	—
Herpestes sanguineus, slender mongoose	—	—	3/1	—	1/1	9/2	5/1	—	—	—	—
Felis libyca, wildcat	—	6/2	28/2	5/2	10/1	24/2	7/2	9/2	—	2/1	—
Felis cf. *caracal*, caracal	—	2/1	25/2	2/1	3/1	18/1	12/2	12/2	3/1	4/1	—
Panthera pardus, leopard	1/1	6/1	7/2	1/1	—	9/1	2/1	—	—	—	—
Panthera leo, lion	—	—	—	—	—	—	1/1	3/1	—	—	—
Orycteropus afer, aardvark	—	1/1	1/1	—	—	5/1	1/1	4/1	—	—	—
Procavia capensis, rock hyrax	4/1	19/2	119/9	31/5	103/6	172/13	47/7	54/4	9/2	20/5	—
Equus cf. *burchelli*, Burchell's zebra	—	—	—	—	—	—	—	—	—	—	1/1
Phacochoerus aethiopicus, warthog	—	—	2/1	1/1	4/1	—	1/1	—	—	—	—
Potamochoerus porcus, bush pig	1/1	9/1	4/1	3/1	3/1	5/1	9/1	1/1	1/1	13/1	1/1
Suidae—general	3/1	30/1	58/2	24/2	34/2	33/2	47/2	9/1	9/1	31/2	1/1
Redunca fulvorufula, mountain reedbuck	1/1	2/1	13/2	1/1	8/1	31/4	—	12/2	1/1	3/1	—
Pelea capreolus, vaalribbok	—	5/2	19/4	3/1	12/2	34/4	4/1	25/5	6/1	9/1	—
Hippotragus sp., roan/sable	—	—	—	—	—	—	—	—	—	1/1	—
cf. *Connochaetes gnou*, wildebeest	—	1/1	—	—	1/1	2/1	—	3/1	—	—	—
Damaliscus dorcas, blesbok	—	—	—	—	—	3/1	—	1/1	—	10/2	—
Ourebia ourebi, oribi	1/1	1/1	21/4	—	7/3	58/7	1/1	8/2	2/1	9/2	—
Oreotragus oreotragus, klipspringer	1/1	3/1	21/3	6/1	14/3	27/4	2/1	6/1	1/1	2/1	—
Raphicerus cf. *campestris*, steenbok	1/1	1/1	7/2	2/1	4/2	21/4	—	—	—	—	—
Ovis aries, sheep	—	—	1/1	—	—	—	—	—	—	—	—
Syncerus caffer, buffalo	—	—	1/1	1/1	—	—	1/1	—	—	—	—
Bovidae—general											
small (oribi, klipspringer, grysbok/steenbok)	27/2	128/5	630/9	110/3	357/7	616/13	302/6	129/4	90/3	110/2	—
small medium (mtn. reedbuck, vaalribbok, sheep/goat)	31/2	125/4	676/12	139/5	350/7	572/8	265/8	253/7	135/6	166/4	—
large medium (hartebeest/wildebeest, blesbok)	—	7/1	51/3	12/2	29/2	35/2	20/2	17/1	4/1	31/2	—
large (cattle/buffalo, eland)	1/1	2/1	12/1	5/1	1/1	2/1	3/1	1/1	—	—	—

TABLE 16
Nkupe Shelter: microfaunal assemblage. * = loose teeth only.

	Layer										
	1	2	3	4	5	6	7	8	9	10	11
Insectivora											
Amblysomus cf. *hottentotus*, Hottentot golden mole	—	—	1	—	1	—	—	2	1	—	—
Chrysospalax villosus, rough-haired golden mole	—	—	—	1	—	1	1	1	—	—	—
Elephantulus cf. *myurus*, rock elephant shrew	—	—	—	—	—	—	1	2	—	—	—
Crocidura cf. *cynaea*, reddish-grey musk shrew	—	—	1	1	—	1	2	1	—	—	—
Crocidura flavescens, greater musk shrew	—	—	4	1	12	15	8	8	5	4	1
Myosorex sp., forest shrew	—	—	3	1	4	8	5	3	4	2	—
?*Suncus infinitesimus*, lesser dwarf shrew	—	—	—	—	—	2	—	—	—	—	—
Chiroptera											
cf. *Rhinolophus clivosus*, Geoffroy's horseshoe bat	—	—	—	1	—	—	—	—	—	—	—
? *Rhinolophus simulator*, bushveld horseshoe bat	—	—	2	1	—	—	—	—	—	—	—
? *Kerivoula argentata*, Damara woolly bat	—	—	1	—	—	—	—	—	—	—	—
Miniopterus schreibersii, Schreiber's fingered bat	—	—	1	—	—	—	—	1	—	—	—
? *Eptesicus hottentotus*, long-tailed serotine	—	—	2	1	—	—	—	—	—	—	—
Rodentia											
Praomys natalensis, multimammate mouse	1	—	—	—	—	—	—	—	—	—	—
Mystromys albicaudatus, white-tailed mouse	—	—	—	2	2	6	2	2	1	3	—
Dendromus melanotis, grey climbing mouse	—	—	—	—	1	1	1	—	—	—	—
Dendromus mesomelas, Brant's climbing mouse	—	—	2	—	—	3	—	—	—	—	—
Tatera sp., gerbil	—	—	—	*	—	*	—	—	—	—	—
Aethomys namaquensis, Namaqua rock mouse	—	—	—	—	—	1	—	—	1	—	—
Dasymys incomtus, water rat	—	—	5	1	3	1	—	1	—	—	—
Mus minutoides, pygmy mouse	—	—	1	—	—	1	—	—	—	1	—
Rhabdomys pumilio, striped mouse	—	4	14	7	3	10	3	8	4	1	—
Thamnomys dolichurus, woodland mouse	—	—	—	—	1	—	1	—	—	—	—
Otomys cf. *angoniensis*, Angoni vlei rat	—	—	3	1	11	7	8	3	4	2	1
Otomys cf. *irroratus*, vlei rat	*	11	106	47	60	25	4	16	10	3	—
Graphirus murinus, woodland dormouse	—	—	—	—	—	—	—	1	—	—	—
Cryptomys hottentotus, common molerat	—	2	69	60	92	9	4	7	21	40	—
Total	1	17	215	125	190	91	40	56	51	56	2

combined proportions decrease and comprise 18 % and 13 % of the Layer 2 and 1 MNIs respectively.

According to Klein (pers. comm.), the overall Nkupe Shelter faunal assemblage is 'broadly similar to the Mgede one . . . [and] has roughly the same palaeoenvironmental implications'. Klein's interpretation of the Mgede Shelter faunal remains was that no noticeable temporal change in animal types, and thus palaeoenvironments, were visible and furthermore that they reflected permanent water nearby, as well as rugged topography and grassland in the vicinity of the site (Mazel 1986*a*). As at Mgede Shelter, this reflects fairly accurately the various habitats presently surrounding Nkupe Shelter.

No LSA human burials have been uncovered in the Thukela Basin or for that matter in any recent rock shelter excavation in Natal. At Nkupe Shelter, as at Driel Shelter (Maggs & Ward 1980) and Mgede Shelter (Mazel 1986*a*), few remains of humans have been found. At Nkupe Shelter there is one human represented by one bone in each of Layers 6 and 7.

Indeterminate fish vertebrae were recovered from Layers 3 (n = 22), 4 (n = 1) and 5 (n = 2), which date to between 2480–3950 BP. According to Hall (pers. comm.) who analysed the fish remains, 'It is not possible to differentiate simple vertebrae but these must have come from either *Barbus natalensis* or *Labeo rubromaculatus*.'

The microfaunal assemblage is presented in Table 16. According to Dr Margaret Avery (pers. comm.) who did the analysis, the species represented are consistent with the presence of grassland throughout, although there is a slight indication of trees and bush, most probably along the river. From Layer 6 upwards there is a suggestion of a progressive extension of the riverine vegetation. There is also an indication that at the beginning and the end of the period of deposition, the vegetation was more open on the valley floor. Avery's full comment on the Nkupe Shelter microfauna is presented in Appendix 1.

I have argued elsewhere (Mazel 1987*b*) that a strong case can be made for the microfauna or a large portion thereof, having been introduced into the site through human predation. I arrived at this conclusion after, firstly, comparing the daily active periods of the most likely non-human predators of the microfauna recovered against those of the microfauna itself, secondly, examining the roosting habits of birds who eat microfauna, and thirdly, checking the defecating habits of other predators of microfauna such as genets and wildcats (Mazel 1987*b*). The patterning evident in the temporal distribution of the microfauna (see below) also provides extra support for the conclusion reached. Furthermore, there are numerous accounts of humans eating microfauna (Avery 1982).

Accepting that humans were probably responsible for a large part of the microfaunal remains recovered, it is of interest to investigate the intensity with which they were exploited through time. In order to compare the different layers, I divided the MNIs recovered from each layer by the volume of deposit from that layer. The results were as follows: Layer 1 = 1; Layer 2 = 13; Layer 3 = 100; Layer 4 = 304; Layer 5 = 106; Layer 6 = 105; Layer 7 = 62; Layer 8 = 98; Layer 9 = 124; and Layer 10 = 79. In Layers 7–10, with the exception of Layer 9, the average densities are generally low, less than a hundred, but thereafter they in-

crease somewhat with Layer 4, which dates to between 3200–3900 BP, standing out as being very high. Above Layer 4 they subside, dropping to very low values in Layers 1 and 2. These results suggest that the most intense predation of microfauna occurred between 4500/4000 and 3000 BP. Had the presence of microfauna at this site been due to their predation by non-human agents, one might have expected a more constant deposition rate of these animals. Particularly noticeable is the near absence of these animals from Layer 1 during which the site was ephemerally occupied by humans.

Counts of freshwater/marine mussel, crab and bird eggshell remains are presented in Table 17. Small numbers of mussels occur in all but three layers (3, 6 and 7). As mentioned earlier, four pieces of modified shell which may be either marine or freshwater mussel were recovered from Layer 10. Bird eggshell remains were recovered from all the layers, with them least represented in Layers 6 and 10. Significantly, crabs were only recovered from Layers 2–4, thus postdating 4000 BP, and this more or less coincides with the beginning of fish exploitation at this site. It is of interest that H. J. Deacon (1976) noticed an increase in crab remains through the Holocene at Melkhoutsboom Cave.

TABLE 17
Nkupe Shelter: frequency of mussels, bird eggshell and crabs.
Among the mussels *Perna perna* is marine, the rest is freshwater.

	Mussels				Bird eggshell	Crab
Layer	Unionidae	*Unio caffer*	Unionidae/ *Perna perna*	?		
1	—	—	—	1	2	—
2	—	—	—	1	25	2
3	1	—	—	—	191	15
4	—	—	—	—	52	31
5	—	9	—	—	170	—
6	—	—	—	—	4	—
7	—	—	—	—	100	—
8	4	—	—	—	30	—
9	3	—	—	—	55	—
10	1	—	2	—	9	—

PLANT REMAINS

Plant remains in the form of seeds (whole and broken), corm bases, leaves, unworked wood, twigs, bark and a flower head were recovered. In Table 18 the presence of seeds according to frequency is presented, and Fig. 25 shows the proportions of the more common seeds. Human usage of the plants identified and other relevant information are presented in Table 19. Most of the plants have edible fruits and berries, just under half have medicinal value, and seven, or possibly eight, can be used as spinach. Some of the plants can also be used for making beverages.

The unworked wood, twigs and bark remains were weighed and their mass per layer was as follows: Layer 1—112,8 grams; Layer 2—597,2 grams; Layer 3—5454,5 grams; Layer 4—268,9 grams; Layer 5—258,1 grams; Layer 6—80,1

TABLE 18

Nkupe Shelter: seed assemblage. One *Lens* sp. (lentil) was identified in Layer 3 but this must either be an incorrect identification or introduced by accident after excavation of this layer. Similarly, the identification of *Brachyciton* sp. at this site and Mgede Shelter (Mazel 1986a) is incorrect because this plant is not indigenous to South Africa. One fragment of *Cyperus* sp. was also identified with the Layer 3 seeds.

	1		2		3		4	
	n	%	n	%	n	%	n	%
Acanthosicyos sp.	—	—	—	—	7	0,05	—	—
cf. *Adenia* sp.	—	—	—	—	9	0,07	—	—
Asparagus sp.	—	—	1	0,09	2	0,02	—	—
Calodendrum capense	1	0,78	139	12,02	886	6,66	123	2,69
Canthium sp.	—	—	—	—	1	0,01	—	—
Cassia sp.	3	2,33	—	—	35	0,76	—	—
Celtis africana	1	0,78	22	1,91	498	3,75	116	2,54
Clerodendron sp.	—	—	—	—	11	0,08	—	—
cf. *Cnestis natalensis*	—	—	—	—	16	0,12	—	—
cf. *Coccolus* sp.	—	—	—	—	7	0,05	—	—
cf. *Colpoon* sp.	—	—	—	—	1	0,01	—	—
Commiphora sp.	2	1,55	—	—	16	1,02	7	0,15
Crypotacarya woodii	—	—	—	—	6	0,05	—	—
Cucumis sp.	—	—	—	—	2	0,02	—	—
Cucurbitaceae	—	—	—	—	4	0,03	—	—
cf. *Curtisia* sp.	—	—	—	—	6	0,05	—	—
Cussonia sp.	—	—	—	—	2	0,02	—	—
Dalenchempia sp.	5	3,88	—	—	—	—	—	—
Diospyros cf. *lyoides* Sub. sp. *querkii*	4	3,10	—	—	—	—	—	—
Diospyros whyteana	1	0,78	—	—	—	—	—	—
Euclea sp.	88	68,22	4	0,35	3	0,02	1	0,02
Euphorbiaceae	—	—	—	—	1	0,01	—	—
Fadogia sp.	2	1,55	—	—	5	0,04	—	—
Ficus sp.	—	—	7	0,61	2	0,02	—	—
Ficus cf. *solicifolia*	—	—	—	—	6	0,05	—	—
cf. *Gossypium herbaceum*	—	—	—	—	2	0,02	—	—
Grewia sp.	—	—	—	—	5	0,04	—	—
Grewia tenax	—	—	—	—	29	0,22	1	0,02
Grewia occidentalis	—	—	—	—	10	0,08	2	0,03
Kiggelaria africana	3	2,33	—	—	3	0,02	—	—
Landolphia sp.	1	0,78	1	0,09	10	0,08	1	0,02
cf. *Leucosidea sericea*	—	—	—	—	—	—	—	—
Melianthus sp.	—	—	—	—	6	0,05	—	—
Melianthus villosus	—	—	—	—	1	0,01	—	—
Momordica sp.	—	—	1	0,09	65	0,49	4	0,08
Myrica cf. *Pilulifera*	—	—	—	—	5	0,04	—	—
cf. *Myrsine* sp.	—	—	—	—	1	0,01	—	—
Ochna sp.	—	—	3	0,26	6	0,05	4	0,08
Olea africana	—	—	—	—	16	0,17	38	0,83
Olea capensis	—	—	—	—	9	0,07	12	0,26
Ozoroa sp.	—	—	—	—	6	0,05	1	0,02
Pachystigma sp.	—	—	6	0,52	26	0,20	19	0,42
Peponium sp.	—	—	1	0,09	2	0,02	—	—
Podocarpus falcatus	6	4,65	868	75,29	9798	73,31	4100	89,77
Podocarpus latifolus	3	2,23	—	—	—	—	—	—
cf. *Prunus africana*	—	—	—	—	1	0,01	—	—
Pygmaeothamnus sp.	—	—	—	—	5	0,04	—	—
Rapanea melanophloes	—	—	—	—	2	0,02	—	—
Rauvolfia caffra	—	—	—	—	1	0,01	—	—
Rhoicissus sp.	—	—	—	—	3	0,02	—	—
Rhyncosia sp.	—	—	5	0,44	4	0,03	—	—
Salvadora angustifolia	—	—	—	—	4	0,03	—	—
Scutia myrtina	—	—	—	—	10	0,08	1	0,02
Sterculia sp.	—	—	—	—	1	0,01	2	0,04
cf. *Thunbergia* sp.	—	—	—	—	1	0,01	—	—
Toddaliopis bredenkampii	—	—	—	—	113	0,85	—	—
Trochomeria sp.	—	—	—	—	—	—	—	—
Ziziphus sp.	—	—	—	—	6	0,05	4	0,08
Adiagnostic	9	6,98	95	8,57	1684	12,66	180	3,94
Total	129		1149		13294		4567	

TABLE 18 (*continued*)

5		6		7		8		9		10	
n	%	n	%	n	%	n	%	n	%	n	%
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
50	2,84	54	5,20	54	4,66	8	2,04	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
111	6,30	52	5,00	52	4,48	52	13,27	12	3,63	1	6,25
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
4	0,23	—	—	—	—	1	0,26	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	1	0,10	3	0,26	5	1,28	1	0,30	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
4	0,23	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
1	0,16	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
3	0,17	—	—	—	—	—	—	—	—	—	—
2	0,11	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
18	1,02	6	0,58	12	1,03	5	1,28	8	2,42	3	18,75
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
34	1,93	16	1,54	10	0,86	4	1,02	5	1,51	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	1	0,09	—	—	—	—	—	—
52	2,95	7	0,67	1	0,09	1	0,26	—	—	—	—
1	0,06	—	—	—	—	—	—	—	—	—	—
1252	71,02	766	73,72	877	75,60	282	71,94	257	77,64	11	68,75
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
1	0,06	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
1	0,06	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
1	0,06	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	1	0,10	—	—	1	0,26	—	—	—	—
14	0,79	3	0,29	—	—	—	—	1	0,30	—	—
214	12,14	132	12,70	150	12,93	33	8,42	47	14,20	1	6,25
1763		1039		1160		392		331		16	

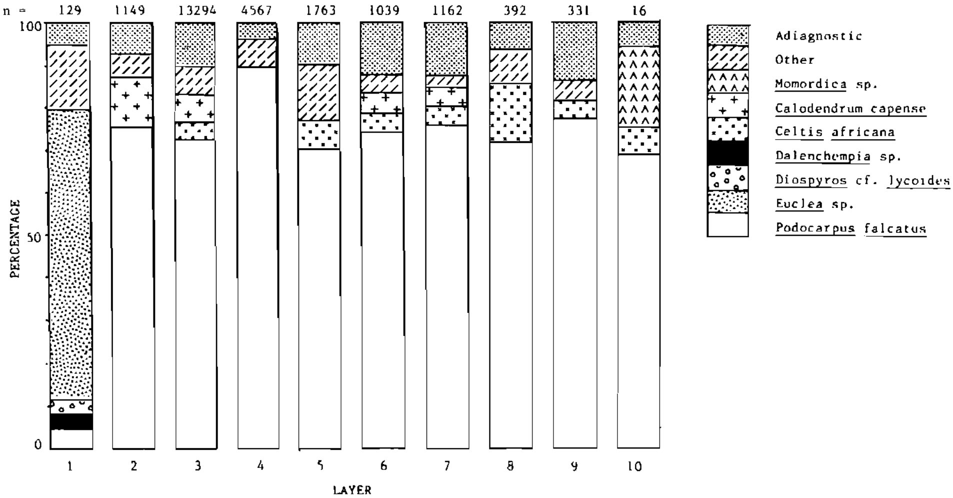

Fig. 25. Nkupe Shelter: composition of the seed assemblages per layer; species comprising less than 3 % are not individually plotted.

grams; Layer 7—8,6 grams; Layer 8—18,4 grams; Layer 9—3,6 grams; and layer 10—0,3 grams. Leaves were recovered from Layers 1—5 but these have not been identified and a protea flower was recovered from Layer 6.

A total of 60 different types of seed were identified. Reference to Table 18 and Fig. 25 shows that most seeds are poorly represented and that in all the layers except for Layer 1, *Podocarpus falcatus* is completely dominant, mostly comprising over 70 % of the total number of seeds in each layer. Besides *P. falcatus*, the only other seeds represented in any quantity are *Momordica sp.* in Layer 10, *Celtis africana* in Layers 3 and 5–9, *Calodendrum capense* in Layers 3, 6 and 7, and *Euclea sp.* in Layer 1. *C. capense* is a source of oil (Palmer & Pitman 1972) while *C. africana* has no known human use but is eaten by birds. Large *C. africana* and *C. capense* trees grow in front of the Nkupe Shelter today and it is possible that seeds from these types of trees were previously growing in front of this site, dropped or were blown into the deposits. *Euclea sp.* fruits can be eaten, have medicinal value and are also a source of oil (Fox & Norwood Young 1982). *P. falcatus* fruits are edible (Fox & Norwood Young 1982) and its kernel is an oil source (Deacon, H. J. 1976). These factors may have been partly responsible for its popularity at this site.

I have investigated elsewhere the possibility that the seeds were introduced by non-human agents (Mazel 1987*b*). After considering a range of possibilities, for example that they were brought in on firewood or were introduced by non-human fruit-eating animals such as birds, microfauna, pigs and baboons, I concluded that it is unlikely that these factors would have been responsible for the introduction of large quantities of seeds into this site, if indeed they were responsible for any. This conclusion, coupled with the knowledge that most of the fruits and berries have known human uses (Table 19) and that large quantities of cultural remains were recovered from Nkupe Shelter, strongly suggests that humans introduced the bulk of the seed remains.

TABLE 19

Human uses of plants identified from Nkupe Shelter: Information from Deacon H. J. (1976), Fox & Norwood Young (1982), Watt & Breyer-Brandwijk (1962) and Wickens (1980). Types identified from these sites with no apparent human usage include: *Celtis africana*, *Cnetis natalensis*, *Cryptocarya woodii*, Cucurbitaceae, *Dalenchampia* sp. Euphorbiaceae, *Kiggelaria africana*, *Melianthus villosus*, *Peponium* sp. and *Toddaliopis bredenkampii*.

	Fruit/ Seed	Medicinal	Spinach	Beverage	Other details
Acanthosicyos sp.	x	—	—	—	—
Adenia sp.	x	—	x	—	—
Asparagus sp.	—	x	x	—	Brush
Calodendrum capense	—	—	—	—	Rich in oil
Canthium sp.	x	x	—	—	—
Cassia sp.	—	x	—	x	—
Clerodendron sp.	x	x	—	—	—
Cocculus sp.	x	x	—	—	—
Colpoon sp.	x	x	—	—	—
Commiphora sp.	x	x	x	—	Roots chewed
Cucumis sp.	x	x	x	—	—
Curtisia sp.	x	—	—	—	—
Cussonia sp.	x	—	—	—	Tubers eaten raw
Cyperus sp.	—	x	—	—	Corm eaten
Diospyrus cf. lycoides subsp. *querkii*	x	—	—	—	Roots chewed
Diospyros whuteana	x	—	—	x	—
Euclea sp.	x	x	—	—	Rich in oil
Fadogia sp.	x	—	x	—	—
Ficus sp.	x	—	—	—	—
Ficus cf. *solicifolia*	x	—	—	—	—
Gossypium herbaceum	—	x	—	—	—
Grewia sp.	x	x	—	—	—
Grewia tenax	x	x	—	—	—
Grewia occidentalis	x	x	—	—	—
Landolphia sp.	x	x	—	—	—
Leucosidea sericea	—	x	—	—	—
Melianthus sp.	—	x	—	—	—
Momordica sp.	x	x	x	—	—
Myrica cf. *pilulifera*	x	x	—	—	—
Myrsine sp.	—	x	—	—	—
Ocna sp.	x	—	—	—	—
Olea africana	x	x	—	x	—
Olea capensis	x	x	—	—	Rich in oil
Ozoroa sp.	x	—	—	—	—
Pachystigma sp.	x	—	—	—	—
Podocarpus latifolus	x	—	—	—	—
Podocarpus falcatus	x	—	—	—	Rich in oil
Prunus africana	x	—	—	—	—
Pymaeothamnus sp.	x	—	?x	—	—
Rapanea melanaphloes	—	x	—	—	—
Rauvolfia caffra	—	x	—	—	—
Rhoicissus sp.	x	—	—	—	—
Rhyncosia sp.	—	—	—	—	Tubers eaten
Salvadora angustifolia	x	x	—	—	—
Scutia myrtina	x	—	—	—	—
Sterculia testa	x	—	—	—	—
Thunbergia sp.	—	x	—	—	—
Trochomeria sp.	—	—	—	—	Roots eaten
Ziziphus sp.	x	x	x	x	—

Increasing numbers of seed remains were recovered from the Nkupe Shelter deposits up to 2500 BP (Table 18). These increases do not simply reflect improved preservation, since favourable preservation conditions characterise most of the deposits, and seeds have been recovered from all the layers excluding Layer 11. These increases also do not simply reflect greater volumes of deposit (Fig. 26). Instead, I believe that they signal an increasing hunter–gatherer exploitation of fruits and berries, especially between 4000–2500 BP (Mazel 1987*b*).

The increasing seed densities at Nkupe Shelter (Fig. 26) are generally accompanied by increased species diversity. This pertains both to the overall seed assemblages (Fig. 27) and the seeds with known human uses (Fig. 28). The only period not to show an increase in diversity with increased quantity is the *ca* 5250–4590 BP period (ie. between Layers 7 and 8). Figs 27 and 28 also suggest that comparatively greater diversification occurred at Nkupe Shelter before Layer 5 than thereafter.

Fig. 29 illustrates the fruiting times of the Nkupe Shelter tree fruits and berries. Clearly, these resources were exploited mostly between December and June, the *P. falcatus* fruiting period (Moll 1981). Few types fruit between July and November and significantly those that do, occur primarily in the upper Nkupe Shelter deposits, especially Layers 3 and 4.

Corm bases and fragments thereof were recovered from Layers 2–9. These have not been identified but their masses have been determined, and according to layer are: Layer 2—2,8 grams; Layer 3—86,4 grams; Layer 4—6,1 grams; Layer 5—10,2 grams; Layer 6—1,6 grams; Layer 7—1,7 grams; Layer 8—0,5 grams; and Layer 9—0,2 grams. Analysis of corm densities in each layer (ie. mass per volume of deposit) reveals a clear trend (Fig. 30). Though a decrease in density occurs between Layers 7 and 6, the Layers 9 to 6 densities generally reflect an insubstantial increase, but thereafter a significant increase in density occurs until Layer 3, with a sudden drop to Layer 2. This suggests, as with the seeds, an in-

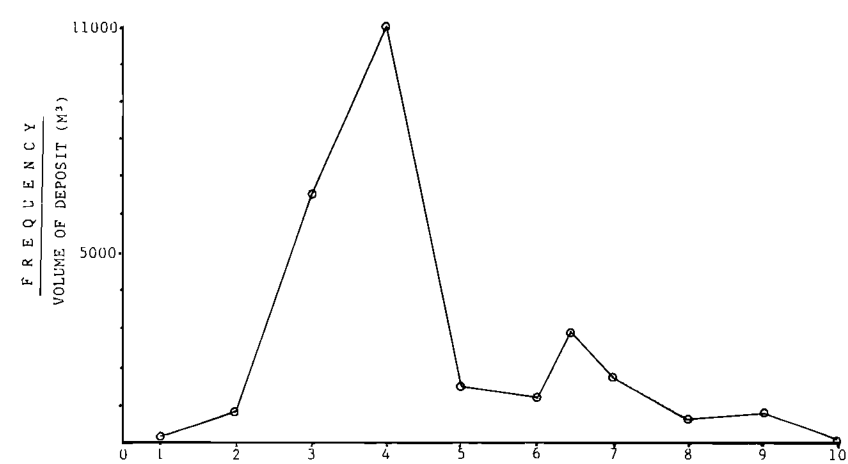

Fig. 26. Nkupe Shelter: seed densities (ie. frequency per volume of deposit (m³)).

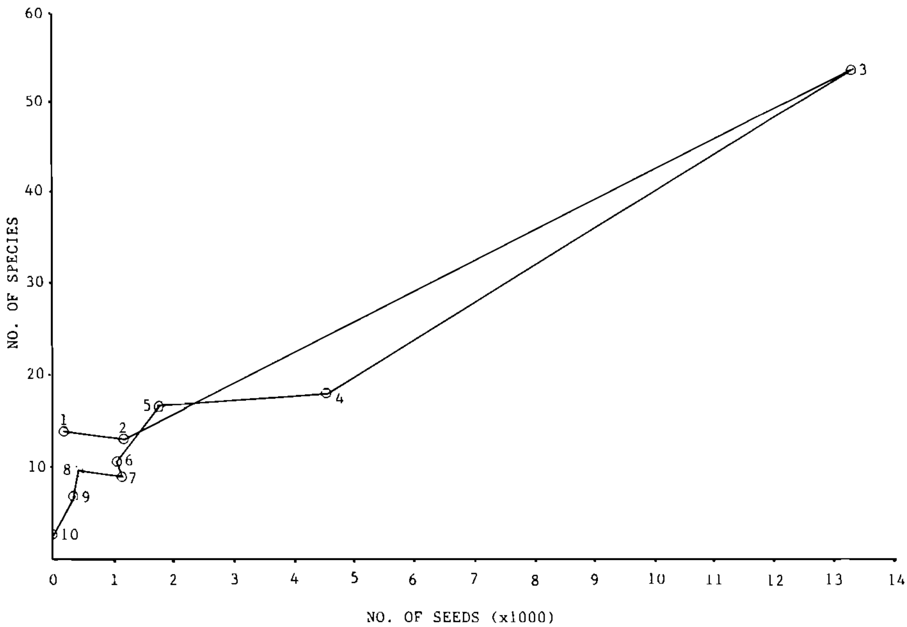

Fig. 27. Nkupe Shelter: relationship between the number of species of seeds identified and the total number of seeds recovered per layer. The numbers on the line indicate layers.

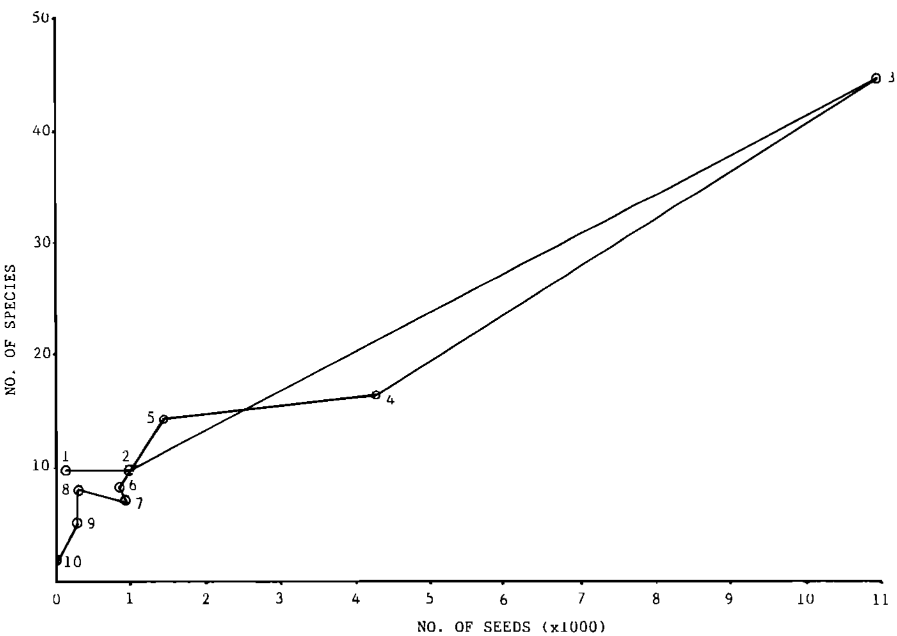

Fig. 28. Nkupe Shelter: seed species known to have been used by humans—relationship between quantity and species diversity. The numbers on the line indicate layers.

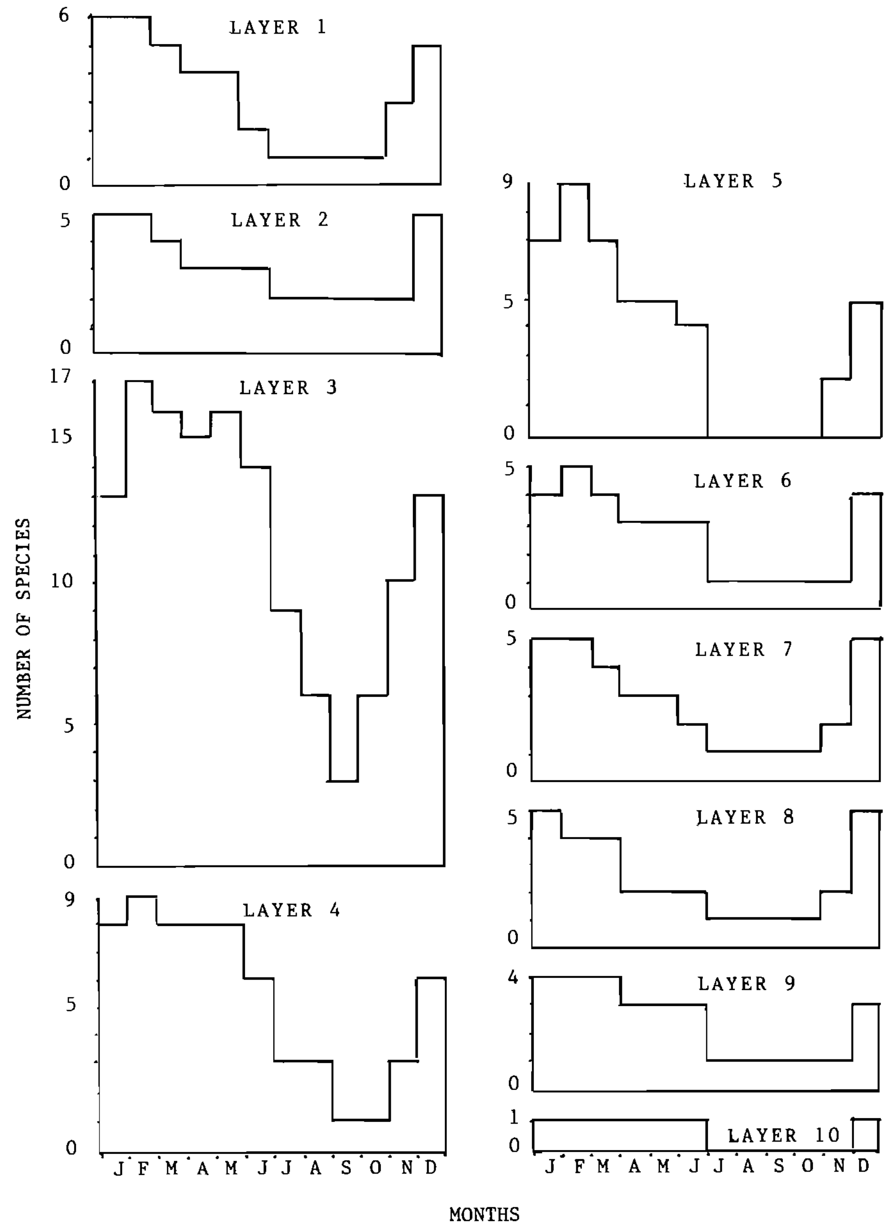

Fig. 29. Nkupe Shelter: seasonal availability of tree fruits and berries. Fruiting information Moll (1981).

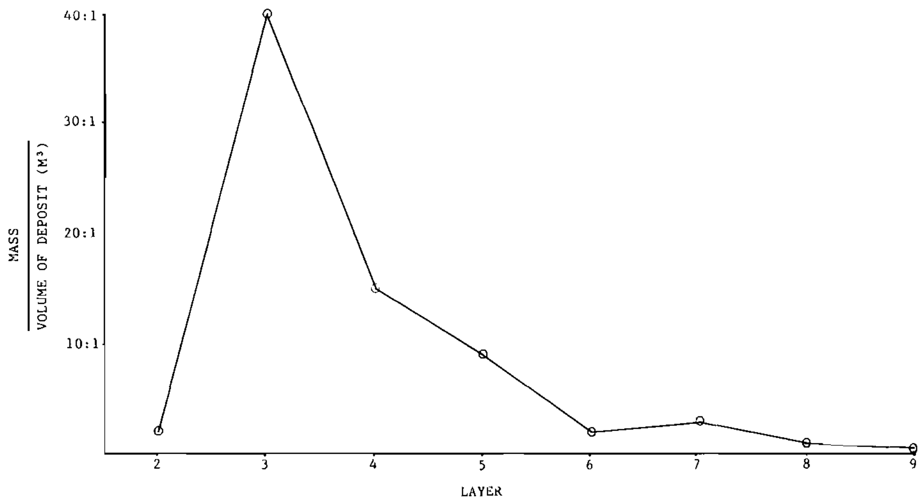

Fig. 30. Nkupe Shelter: corm densities (ie. mass per volume of deposit (m^3)).

creasing deposition rate, and in turn, increasing exploitation of this food resource. The increased corm residue at this site is not considered to be an artefact of improved preservation. Furthermore, it is unlikely that the corm remains were introduced by non-humans. No evidence exists to suggest that baboons, the most likely non-human agents to introduce corms into a rock shelter, inhabited this site intensively.

It would appear from the plant remains, that the Nkupe Shelter hunter–gatherers chose to exploit large quantities of fruits and berries in preference to underground plant foods. This phenomenon assumes added interest when viewed in the light of the hierarchy of plant foods used by the Kung hunter–gatherers (Lee 1979). Lee identified six classes of foods (primary, major, minor, supplementary, rare, and problematic) using six criteria (abundance, duration of eating season, ease of collecting, tastiness, lack of side effects, and nutritional value) as well as his observations on the frequency of use and amounts used. A comparison of the fruits and berries, on the one hand, and the underground plant foods, on the other (Lee 1979: 171), showed that 3 % and 28 % of the former was primary and major food respectively, whilst none of the latter was primary food and only 7 % were major foods. Almost equal proportions of fruits and berries and underground plant foods were minor, supplementary and rare foods, but only 7 % of the fruits and berries were problematic compared with the 27 % of the underground plant foods. Assuming similar plant food preferences for the Nkupe Shelter hunter–gatherers would explain why fruits and berries were exploited in large quantities in preference to underground plant foods.

DISCUSSION

Nkupe Shelter is a key site in documenting and explaining Thukela Basin hunter–gatherer history. The information generated by the excavations at this site has already formed an important part of a detailed synthesis of Thukela Basin Holo-

cene hunter–gatherer history (Mazel 1987*b*). It is beyond the scope of this site report to present this synthesis in full here. Instead, I shall outline some of the conclusions reached in this synthesis and the role the Nkupe Shelter information played in generating and supporting them.

I have argued that Thukela Basin hunter–gatherers experienced a process of economic intensification, which can be defined as increases in both productivity and production (Mazel 1987*b*). Concentrating on increased production, I submitted that the Nkupe Shelter 7000–2000 BP hunter–gatherers progressively extracted more food from nature, resulting in greater emphasis on already exploited resources as well as diversification of the diet. The features of the Nkupe Shelter hunter–gatherer subsistence strategies which reflect this best are:

1. the increased emphasis on small ground game such as hares and dassies, with the highest proportions of these animals combined being recorded between 2500–4000 BP;
2. the most intense predation of microfauna at Nkupe Shelter between 3000–4000 BP;
3. the beginning of fish and crab exploitation around 4000 BP;
4. the increase in plant food exploitation which is evidenced not only by increases in seed and corm remains (especially after 4000 BP), but also the complementary artefactual evidence in the form of increased adze proportions and the greater number of grindstones in the upper layers. I have submitted (Mazel 1987*b*) that while adzes, which were woodworking tools, were probably used for the manufacturing and maintenance of many types of wooden tools, their primary function would have been in the manufacturing and maintenance of digging sticks, which, in turn, would have been used for the exploitation of underground plant foods. Grindstones would have been primarily used in the processing of plant foods.

The Nkupe Shelter hunter–gatherer subsistence adjustments may also have been associated with changes in the seasonality of occupation. The early hunter–gatherer emphasis on fruits and berries, specially *Podocarpus falcatus*, suggests, if anything, a primarily December–June occupation of this site (Fig. 29). The growing emphasis on fish, crabs, micromammals, underground plant foods and dassies and hares would have increasingly freed people from seasonal restrictions and enabled them to occupy the site for longer periods of the year. Iridaceae geophytes are primarily available between September and March with some available as early as July, but numerous other underground plant foods in the form of roots, stems, tubers and rhizomes would have been exploitable all year round (Cable 1984, Mazel 1987*b*). Micromammals and dassies would also have been available all year round, whilst fish spend only spring and summer in areas above 1 525 m and Nkupe Shelter is at an altitude of 1 618 m. Sometime after 4000 BP and most likely between *ca* 3500–2480 BP when underground plant foods were mostly intensely exploited, Nkupe Shelter may have been occupied for extended periods, at all times of the year. This is not meant to imply that they occupied this site all year, every year, but rather that their occupation was not seasonally specific.

I have submitted, following others (eg. Friedman 1974, Lourandos 1983, O'Laughlin 1975), that in the dialectical relationship between the social relations of production (ie. the relations people enter into to reproduce society as a social and economic unit) and the forces of production (ie. society's technological and environmental conditions and the organisation of production), the social relations are ultimately determinant. In the context of the present discussion, this would mean that the changes discerned in the human/environment relationship (ie. economic intensification) would have been precipitated by adjustments in the social sphere.

After analysing the various material cultural elements which I considered to be susceptible to stylistic and social signalling, I concluded that the Thukela Basin Holocene hunter–gatherer society experienced three phases of social structural development. During the first phase, which dates to the beginning of hunter–gatherer occupation of the Thukela Basin, one alliance network covered the entire research area, except perhaps the central Thukela Basin. Thereafter, considerable social restructuring associated with population growth occurred, and this resulted in the emergence shortly before 4000 BP of three alliance networks in the research area (Mazel 1987*b*). These three social regions lasted until around 2000 BP when the arrival of iron-using farming communities in the Thukela Basin influenced more structural changes (Mazel 1986*b* 1987*b*).

These alliance mating networks have been defined as dialectically, socially and economically distinct groups of bands integrated through a dynamic network of social interaction into a cohesive social unit which is able to reproduce itself biologically and socially (Mazel 1987*b*). Moreover, as Wobst (1974) argued, these networks probably constitute the highest level of social integration among hunter–gatherers. Differences between groups are likely to be expressed in the types of material culture they carry and distribute as well as the idiosyncratic style applied to items common to different groups (Clark, G. 1975, Clarke, D. L. 1968, Deacon, J. 1986, Mazel 1987*b*).

While it is feasible to reach conclusions about economic intensification through the study of food and artefact remains from individual sites, this does not apply to the analysis of socially informative material cultural items. In this sphere, conclusions can only be generated through the comparison of information from different sites. This is not an appropriate place for a detailed discussion on the criteria I used to generate social information about the Thukela Basin Holocene hunter–gatherers. Rather, I will illustrate the nature of the analysis I conducted by briefly focusing on two types of formal tools—backed pieces and backed scrapers. As with the other stone artefact criteria I investigated (Mazel 1987*b*), and disregarding the raw material composition of the Nkupe Shelter stone artefacts for the time being, the study of these artefacts suggests a uniformity among the early assemblages throughout the research area which then disintegrated and by 4000 BP was replaced by three sets of geographically distinct assemblages.

Among the backed pieces, the early assemblages are all dominated by segments. Between then and 4000 BP differences begin to emerge between the various assemblages and after 4000 BP there are, firstly, those assemblages whose diagnostic component is dominated by segments (ie. Nkupe Shelter); secondly,

those dominated by backed points and blades which also have segments (ie. Sikhanyisweni Shelter); and, thirdly, those without segments and dominated by backed blades and points (ie. Diamond 1 and Clarke's Shelter). The sites with segments are situated to the north of the Thukela River, and those without, to the south.

The early backed scraper assemblages are dominated by Type 3 backed scrapers (ie. backed along two laterals perpendicular to the working edge). Type 3 backed scrapers continue thereafter to dominate the Sikhanyisweni Shelter assemblages and this distinguishes it from the other sites. Type 1 backed scrapers (ie. backed opposite the working edge), appear shortly after 6000 BP at Gehle Shelter and Nkupe Shelter. Thereafter they are represented in only one other Nkupe Shelter assemblage (Layer 7), but occur in increasing proportions at Gehle Shelter. The *ca* 4000 BP Diamond 1 and Gehle Shelter assemblages contain almost equal proportions of Type 1, 2 (ie. backed along one parallel perpendicular to the working edge) and 3 backed scrapers. Thereafter, only two of the four Diamond 1 and Clarke's Shelter 3000–2000 BP assemblages contained backed scrapers, both producing Type 1 scrapers (which do not occur at Nkupe Shelter after 4590 BP) and Type 3 scrapers, with Type 2 scrapers occurring only at Diamond 1. At Nkupe Shelter, after 4000 BP Type 2 backed scrapers are most prevalent. Thus, as with the backed pieces, the backed scrapers reflect a post-4000 BP Nkupe Shelter–Sikhanyisweni Shelter–Diamond 1 and Clarke's Shelter division of sites.

The raw material composition of the Nkupe Shelter stone artefacts also supports the suggestion that the occupants of this site had wider ranging contacts before 4000 BP than thereafter. CCS nodules erode out of the high Drakensberg basaltic soils and thus do not occur naturally north of the Thukela River. Out of the Drakensberg, CCS nodules can be collected from the rivers that drain it. Significantly CCS is best represented in the Nkupe Shelter levels dating to before 4000 BP.

If the mussel shells recovered from the Nkupe Shelter 6650 BP level are indeed of marine origin, this would provide added support for the proposition that the early Nkupe Shelter inhabitants were part of an extensive network, which, although perhaps not extending to the coast itself, had some form of coastal contact. No other marine shell, or possible marine shell, was recovered from the overlying levels at Nkupe Shelter.

I have submitted that two of the three 4000–2000 BP Thukela Basin alliance networks were situated to the north of the Thukela River and one to the south (Mazel 1987*b*). Of the northern alliance networks, Nkupe Shelter occurs in one and Sikhanyisweni Shelter in the other. I considered the possibility that the occupants of these sites might have been part of the same alliance network, especially as they are only 35 km apart, but after close analysis of their material cultural remains, I concluded that they are arguably sufficiently different to view them as situated in the territories of different social networks (Mazel 1987*b* 1988). One of the more important criteria distinguishing these sites was that Sikhanyisweni Shelter was the only site in the Thukela Basin to produce evidence of OES bead manufacture.

The post-2000 BP deposits at Nkupe Shelter are ephemeral, and as submitted earlier, may be comprised largely of disturbed earlier deposits. I suggested, on the basis of the cane glass bead found in Layer 2, that this deposit may postdate AD 1000. The absence of, or very ephemeral hunter–gatherer occupation of this site between 2000 BP and AD 1000 is of particular interest when considering that it was increasingly intensively occupied between *ca* 7000–2000 BP. I have submitted that the arrival of farming communities in the central Thukela Basin early in the first millennium AD had the effect of attracting hunter–gatherers into a previously unoccupied or sparsely inhabited area, and this influenced a depopulation of the upper Thukela Basin (Mazel 1986*b* 1987*b*). This may account for the absence of, or very ephemeral hunter–gatherer occupation of, Nkupe Shelter up until the second millennium AD.

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APPENDIX

Comments on micromammalian fauna from Nkupe Shelter

by **D. M. Avery**

Comments will be restricted to Layers 3–10; samples from the other layers were inadequate for discussion. The best represented species are the vlei rats *Otomys* spp (probably mainly *O. irroratus* but with some *O. angoniensis*) and the common molerat *Cryptomys hottentotus*. At the next level of frequency two shrews (*Crocidura flavescens* and *Myosorex* sp.) and two other rodents (*Mystromys albicaudatus* and *Rhabdomys pumilio* occur in each of the layers discussed. Changes in percentage representation of *Otomys* spp shows very low correlation with that of *C. hottentotus*; the latter species, on the other hand, shows a high negative correlation with both *C. flavescens* (r = 0,753) and *Rhabdomys pumilio* (r = 0,815). This is likely to indicate that at the beginning and towards the end of the period of deposition, the vegetation was more open on the valley floor or other areas with a suitable substrate to accommodate the burrowing *C. hottentotus*, probably reflecting higher rainfall, or more effective precipitation, between about 5000 and 4000 BP. It appears, however, that the rivers were adequately fed throughout except

possibly at the time of the earliest layer when a very low proportion of *Otomys* spp, together with a lack of swamp rat *Dasymus incomtus*, might suggest that the riverine vegetation, and presumably stream flow, was greatly reduced. (It might, however, merely indicate that there were a great many *C. hottentotus* which were easier to catch.) There is an overall increase in proportions of *Otomys* spp through the sequence and *D. incomtus* is consistently present from Layer 6 upwards, tending to suggest a progressive extension of riverine vegetation through this time. The species present are consistent with the presence of grassland throughout, although there is some slight indication of trees or bush, most likely along the river.

The Shannon Wiener index (H) of general diversity (= number of species and evenness of species representation in the sample) shows overall rise from Layer 10 to Layer 6 and then a sharp drop to Layers 5–3. There are corresponding high values of H for samples dated about 4500 BP at Wonderwerk in the northern Cape Province and at Boomplaas in the southern Cape Province (but not at Byneskranskop on the southern Cape coast) which could correspond with the Climatic Optimum mentioned by Tyson (1986: 48). The drop in H values at Nkupe is also in line with the world neoglacial advance about 3–2000 BP (Tyson 1986: 61). There is a strong negative correlation ($r = 0{,}897$) between values of H and percentages of *C. hottentotus* in samples which must mean more than that high numbers of this species are swamping the pattern; there are also high numbers of *Otomys* spp but there is very little correlation between the latter species and values of H. This is probably explained by the fact that the riverine habitat is controlled by possibly different weather conditions in the catchment area, even though this may not be far away, whereas other habitats are directly affected by the weather in the immediate vicinity. In all probability conditions were relatively warmer and wetter during the central period represented by the samples than they were before or afterwards, thereby favouring the growth of vegetation which harboured an increased variety of species. During the colder, drier periods *C. hottentotus* would come into its own.

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